TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 9.] 1917. [No. 1.

ENTERIC FEVERS IN THE TROPICS.

ARCHIBALD (R. G.), HADFIELD (G.), LOGAN (W.) & CAMPBELL (W.)—**Reports on the M. and H. Laboratories dealing with the Diseases affecting the Troops in the Dardanelles.**—*Jl. Roy. Army Med. Corps.* 1916. June. Vol. 26. No. 6. pp. 695–724. With 10 charts. [Typhoid and Paratyphoid Fevers. pp. 700–709 & 713–714.]

Only part of this long and interesting "Report" is dealt with in this section of the *Bulletin*.* The authors are all of them officers in the "R.A.M.C." and their work is valuable not only for intrinsic merit, but because, as will be duly noticed, it confirms work done by other observers.

"Bacilli of the typhoid-paratyphoid group were obtained by blood culture from 147 cases; of these 21 were *B. typhosus*, 41 *B. paratyphosus* B, 70 *B. paratyphosus* A; in addition there were 15 inagglutinable strains of the paratyphoid group, of which 1 resembled *B. paratyphosus* A in type, others *B. paratyphosus* B."

It is pointed out that it is only during the early days that positive results can be expected, the authors giving, in proof of this statement as to the duration of the bacillaemia, the following figures:—

"All cases, including typhoid and infections by inagglutinable paratyphoid-like bacilli	6·35 days.
B. paratyphosus B infections	5·37 ,,
B. paratyphosus A ,, ...	5·99 ,,
B. typhosus ,, ...	8·30 ,,
B. paratyphosus (inagglutinable infections)	9·1 ,, ."

"There appeared, therefore, to be a longer bacillaemia in the *B. paratyphosus* A infections than in the *B. paratyphosus* B, with the *B. typhosus* infections longer than either. . . ."

"These facts go to emphasize the necessity of making blood cultures in the *first* week from all patients showing a sudden or moderately sudden illness with rise of temperature, headache, shivering, generalized pains, and a furred tongue. . . ."

"Many opportunities of doing blood culture were lost owing to prevailing sand-storms that rendered an aseptic operation in the tents impossible.

"A two per cent. solution of sodium taurocholate in distilled water was the medium used for blood culture."

* The greater part is summarised in Vol. 8, pp. 378–80.

(C334) Wt.P3137/63. 1,850. 1.17, B.&F.Ltd. G.11/4.

As a rule 5 to 7 cc. of blood were mixed with 10 cc. of the medium at the bedside, and it is important that the mixture should be well shaken before it is put into the incubator. From this medium McConkey's plates were spread daily for four days till growth was evident. Sub-cultures were made from isolated colonies and these were tested with glucose, lactose, etc. and against specific sera.

"The less satisfactory methods of agglutination tests with the patient's serum and examination of the stools were resorted to where request for blood culture in the early stages had not been made or where blood culture had proved negative; in some instances, too, the patients had passed the stage of bacillaemia by the time they reached the hospital. . . ."

"For faeces McConkey's plates were used as a routine, with Endo and Conradi-Drigalski as an occasional variation."

The clinical features of the various infections and the cultural behaviour of the respective bacilli conformed to what is generally known except as regards "a noticeable characteristic of *B. paratyphosus* A." This bacillus while agglutinating with a specific serum after it had lost its power of progressive motion retained a "twirling, rotatory movement"; "a whole clump of agglutinated bacilli, eight to twelve in number, spinning round." The reviewer does not think that this phenomenon has been previously recorded.

The chart (Fig. 1) shows the relative proportions of the three types of enterica prevalent at M during the months August to January.

"No inagglutinable strains and no cases diagnosed by agglutination tests with the patients' serum are included. The figures represent the number of *B. typhosus*, *B. paratyphosus* B, and *B. paratyphosus* A obtained from patients during each month in the Laboratory, calculated as a percentage of the total number isolated each month of the three combined."

"In August typhoid led the field. . . . In September and October the paratyphoid B steadily rose, while the typhoid and paratyphoid A fell to a negligible amount. . . . About the middle of November, with almost startling suddenness, the paratyphoid A shot up, while paratyphoid B fell. The typhoid, as before, remained low."

If these statements extracted from the Report, and the chart, are compared with statements and charts in another report on an epidemic of "camp jaundice" connected with *B. paratyphosus* B (Sarrailhé and Clunet, this *Bulletin*, Vol. 8, p. 73 et seq.) resemblances will be found. Atypical paratyphoid bacilli were found in both sets of cases. These bacilli came from the same topographical area and from the same class of patients.

On page 714 of the Report it is recorded :—

"Catarrhal jaundice formed the greater portion of the so-called 'epidemic jaundice.' . . ."

"Blood cultures were made from sixty-four cases of jaundice; most of these were cases of catarrhal jaundice with slow pulse and normal or subnormal temperature; all of these gave negative results. Cases of jaundice with pyrexia were less frequent, but nine of them gave a positive result, *B. paratyphosus* B being found in five cases, an inagglutinable strain of *B. paratyphosus* in two cases, and Gram-negative, motile, non-lactose fermenters (which could not be worked out owing to the evacuation) in two cases. . . ."

"In these cases of positive blood culture one gained the impression that the jaundice and the paratyphoid fever were concomitant infections."

Fig. 1.*

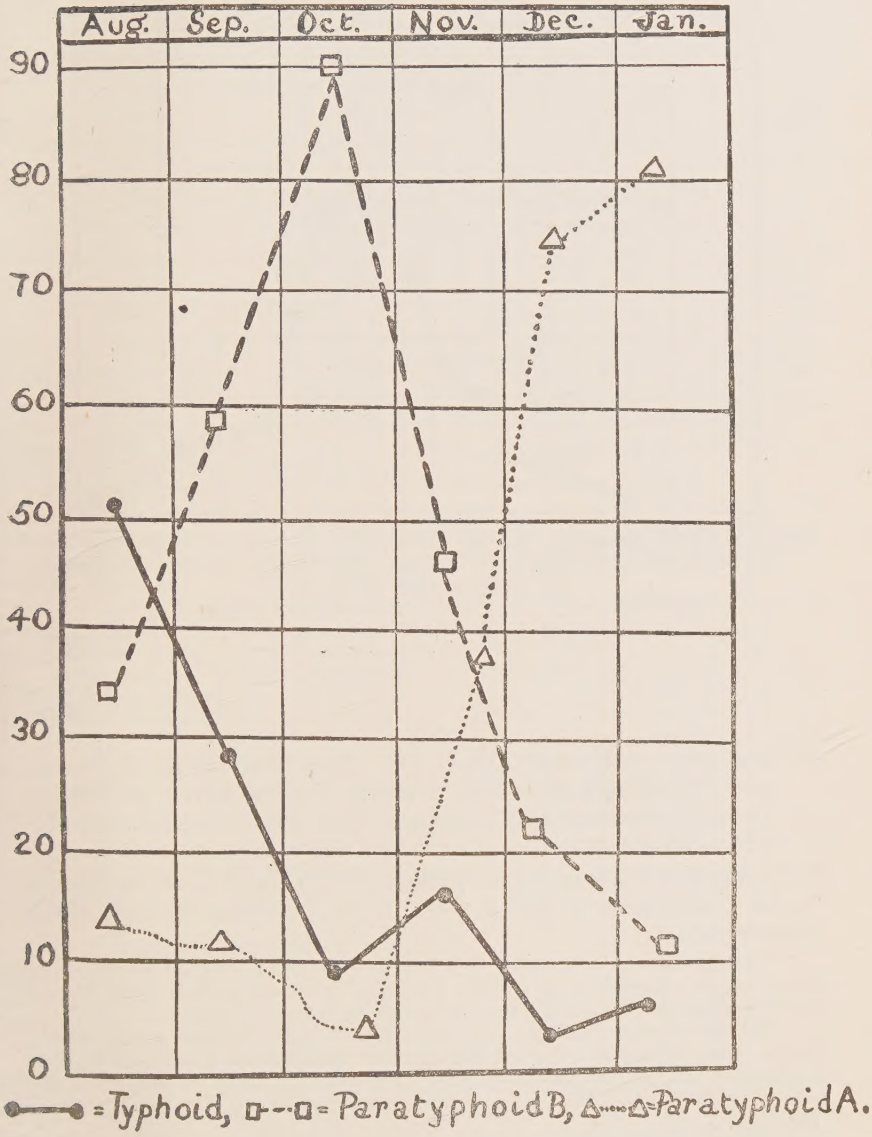

Fig. 1. Chart representing monthly incidence of typhoid, paratyphoid A and paratyphoid B diagnosed by isolation of their respective organisms.

* Reproduced by permission from the *Journal of the Royal Army Medical Corps.*

Future work will decide. We must "follow the Gleam."

Fig 2.*

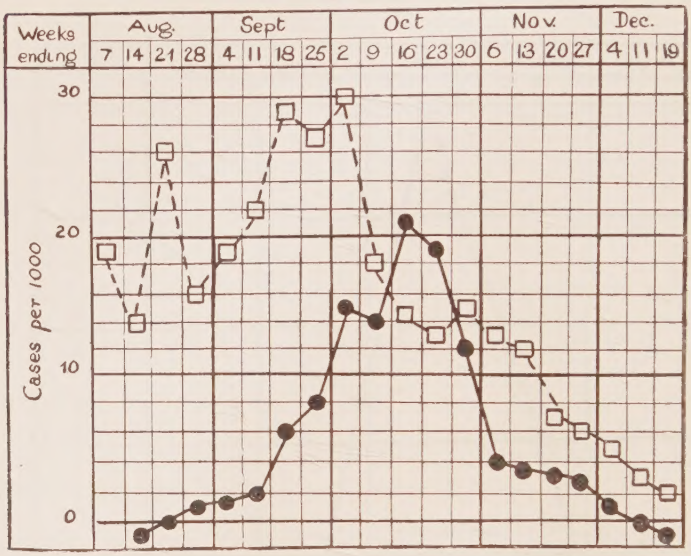

FIG. 2.—Chart showing the incidence-rate of epidemic jaundice and diarrhoeal diseases per 1,000 troops in one division for period August 7th to December 19th, 1915.

One division
(*a*) "Jaundice" ●——●
(*b*) "Diarrhoeal Diseases"
Diarrhoea ..
Enteritis ..
Dysentery ..
□···□

J. H. Tull Walsh.

MARTIN (C. J.) & UPJOHN (W. G. D.). **The Distribution of Typhoid and Paratyphoid Infections amongst Enteric Fevers at Mudros, October-December 1915.**—*Brit. Med. Jl.* 1916. Sept. 2. pp. 313–316. With 1 fig.

The authors are working as pathologists to No. 3 General Hospital "A.I.F.," as officers of the "A.A.M.C." The following are the essential clauses :—

"During the three months October to December, 1915, we gathered a considerable amount of data, which we shall proceed to deal with, in view of its bearing upon the distribution of enteric fevers at Gallipoli. . . ."

"We were aware that the interpretation of agglutination results would, in the case of persons inoculated against typhoid, be a matter of some difficulty; but we had the advantage of working in close co-operation with our physicians, who kept us in touch with the subsequent history of the patients. . . ."

"The emulsions were, in the first instance, made from strains of typhoid, paratyphoid A, and paratyphoid B bacilli obtained from the Lister Institute. The first is a readily agglutinable strain, which has been propagated in the laboratory for several years. The two last are descendants of Schottmueller's original strains. Subsequently we substituted a locally isolated strain of *B. paratyphosus* B, as the Schottmueller's strain did not form good emulsions. , . ."

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TABLE 1.

No agglutination (minimal dilution of serums 1 in 50 or 1 in 100) ..		163–163
Agglutination to *B. typhosus*		138–138
Agglutination to *B. paratyphosus* A		66
Co-A.	,, ,, *B. paratyphosus* A and *B. typhosus*	136
	,, ,, ,, ,, ,, and *B. paratyphosus* B (last slight or transient) ..	9
	,, ,, *B. paratyphosus* A and *B. paratyphosus* B (latter slight or transient)	2–213
Agglutination to *B. paratyphosus* B		19
Co-A.	,, ,, *B. paratyphosus* B and *B. typhosus*	88
	,, ,, ,, ,, *B. typhosus* and *B. paratyphosus* A (last slight or transient) ..	5
	,, ,, *B. typhosus* and *B. paratyphosus* A (latter slight or transient)	1–113
		627

"The 163 instances in which the serum gave no agglutination in the minimum dilution used—1 in 100—may be summarily dismissed, as they furnish no information. They comprise cases in which the serum was sent for examination too early in the disease, and others in which the subsequent clinical history indicated that the patient was suffering from some disease other than one of the enteric fevers."

There remain 464.

"Of these, 213 serums agglutinated *B. paratyphosus* A, and are for reasons given above [higher dilution], regarded as significant of paratyphoid A infection. For parallel reasons we regard 113 as infections by paratyphoid B.

"The determination of the number of typhoid infections is not so simple.

"The 138 cases in whose serums only typhoid agglutinins were discovered were not necessarily typhoid fevers, for all but five of the patients had been inoculated. These five exceptions we place to the credit of typhoid infections on the agglutination findings. In seven other cases we succeeded in isolating *B. typhosus* from the blood or excreta either during life or after death, leaving 126 cases in which the serological observations might be interpreted either by previous inoculation or by recent infection."

To determine the amount of agglutination due to inoculation "the blood of members of the staff and hospital orderlies, who had not been sick, was examined under similar conditions to those employed in the case of patients:—

7 agglutinated in a dilution of	.. ..	1 in 800
12 ,, ,, ,, ,,	.. ..	1 ,, 400
22 ,, ,, ,, ,,	.. ..	1 ,, 200
16 ,, ,, ,, ,,	.. ..	1 ,, 100
18 did not agglutinate in a dilution of	..	1 ,, 100

"In addition to the above experiment, the pooled serum of twenty-eight men inoculated on the same day fourteen months previously was found to give a good agglutination at 1 in 200—a result in close agreement with the above."

Excluding cases which gave reaction but were suffering from other diseases, also 35 cases of epidemic jaundice, there remain 91 cases.

These "were either investigated at the time or their records carefully scrutinized for us by Lt.-Col. Stawell, consulting physician to our unit. . . . Without his assistance in this matter it would not have been possible to draw what is perhaps the most important conclusion from our observations—namely, the relative prevalence of true typhoid fever at Gallipoli. After submission to his scrutiny, these 91 cases which might possibly have been

typhoid infections were reduced to 13. This number includes all those which, on clinical grounds, might have been cases of one or other of the enteric fevers. It is certainly a maximal estimate, for, as mentioned above, we have reason to believe that some cases of paratyphoid A fever, which the method we employed failed to discover, are included in it."

[Even less than 1 in 50 is diagnostic of paratyphoid A infection.]

"The results of the analysis of our observations after this eliminative procedure had been applied to the cases whose serums agglutinated only *B. typhosus* are as follows :—

Cases of typhoid fever	25	.. ..	7 per cent.
,, ,, paratyphoid A	213	.. ..	61 ,,
,, ,, ,, B	112	.. ..	32 ,,
	350		

"As soon as we became aware from our observations that the great proportion of the cases of enteric fevers amongst Australian troops was due to paratyphoid infections, we represented the facts to the Director Medical Services of the Commonwealth forces and advised that Australian troops should be at once inoculated with a vaccine containing paratyphoid and typhoid bacilli. . . . Early this year all Australian units were so inoculated."

J. H. T. W.

FILDES (P.). **The Duration of the Immunity following Antityphoid Inoculation.**—*Jl. Roy. Nav. Med. Serv.* 1916. July. Vol. 2. No. 3. pp. 311–312.

This short, concise and well-written paper is the work of the Assistant Bacteriologist to the London Hospital, working at the Royal Naval Hospital, Haslar. Only necessary facts and conclusions are given; there is no padding.

"The men here referred to were admitted from the Eastern Mediterranean between December, 1915, and February, 1916, in a state of convalescence after various forms of bowel disease. . . ."

"The series consists of 1,035 men, of whom 106 were not inoculated and 929 were inoculated. The uninoculated included twenty-seven cases of typhoid fever (25 per cent.), while among the inoculated were 104 cases (11 per cent.). . . ."

"It is therefore clear that the incidence of typhoid per cent., was more than twice as great among the uninoculated as among the inoculated. The effect of the inoculation is still more marked if the men are arranged according to the length of time which has elapsed since inoculation :—

					Per cent.
"929 men inoculated	321 inoculated within 6 months	had 14 cases of typhoid	=	4·3
	421 ,, ,, 7–12 ,,	,, 52 ,, ,, ,,	=	12·3
	187 ,, ,, 13–18 ,,	,, 38 ,, ,, ,,	=	20·3.

"When these figures are compared with those relating to the uninoculated, it is seen that after twelve months the incidence of the disease among the inoculated (20·3 per cent.) is almost as high as among the uninoculated (25 per cent.)."

"Conclusions.

"(1) By the methods of inoculation in use in the Navy the incidence of typhoid may be reduced in the proportion of three to one in the first year after inoculation.

"(2) After one year no material protection is given.

"(3) Every man should be reinoculated against typhoid every twelve months if he is exposed to infection."

J. H. T. W.

de MELLO (Froilano), BORCAR (Atmarama) & de SOUSA (Loreto). **Contribution à l'étude des fièvres remittentes de l'Inde Portugaise.** —*Anais Sci. da Faculdade de Med. do Pôrto.* 1916. Vol. 3. 41 pp.

The author points out that since the outbreak of the " Great War " our knowledge of enteric fevers has greatly increased. Owing to certain atypical clinical signs a group of " fevers," not uncommon in Portuguese India and other parts of Asia, were not readily recognised and were, for want of accurate knowledge, called " nervous fever," " remittent fever," or " climatic fever." Uncertainty breeds curiosity in the scientific mind and leads to investigation. Dr. De Mello determined to classify such fevers occurring in Portuguese India. He emphasises the importance of accurate laboratory work and the paramount importance of blood-culture. Attention had previously been called to these atypical " fevers " by the author in 1914 at the All India Sanitary Conference, Lucknow ; and, also in a " paper " read at La Première Conférence Sanitaire de l'Inde Portugaise. Research has shown that many of these " fevers " are due to one or other of the *Enterica* group of bacilli. Although these records contain little that is new the work has been well done. Twelve cases are recorded with full clinical details, with temperature charts, etc. Mortality tables for 1912, 1913 and 1914 are given and there are tables of bacteriological findings and provings, on culture media and with agglutination tests.

The author in chief concludes with the opinion that " the remittent or climatic fevers of Portuguese India, although existing as a clinical type, cannot be considered as having the origin attributed to them before the institution of laboratory studies in this country ; and until positive reasons are shown to the contrary, one must presume that they are only infections due to the typho-paratyphoid group."

On page 17 of the pamphlet it is stated that " recent studies have shown that the reaction of Widal, although a sign of typhoid infection, has not, however, great value when employed for differential diagnosis between typhoid and paratyphoid." This question has been noticed and dealt with by COURMONT, CHATTOT and PIERRET [see below, page 14].

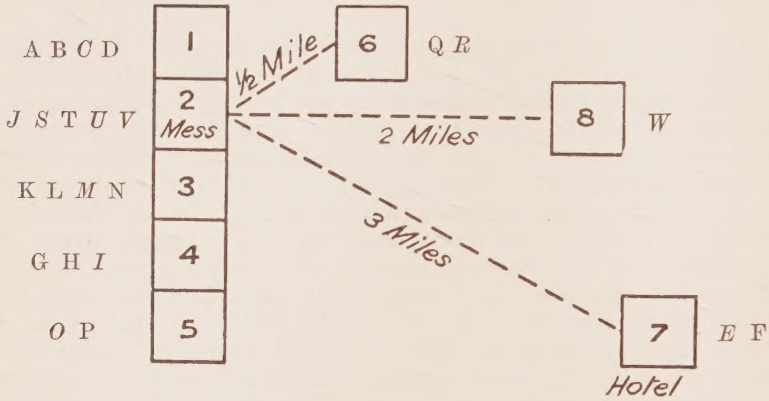
J. H. T. W.

KEYWORTH (W. D.). **Diarrhoea and Continuous Fever due to Oysters.**— *Indian Med. Gaz.* 1916. Aug. Vol. 51. No, 8. pp. 286–292. With 1 diagram.

This is a record of " the effect of an article of diet heavily infected with *Bacillus typhosus* on a community mostly inoculated against enteric."

The cases of infection occurred during February and March 1914 and, although in his own person Captain Keyworth, I.M.S. " escaped with a mere attack of diarrhoea," he was among the victims. The infection was traced to a dinner party given at Poona. Twenty-two persons were present at the feast. " Of these twenty-two persons eighteen had eaten oysters, six being subsequently ill with diarrhoea and five with continuous fever."

DIAGRAM OF BUNGALOWS.



Note.—The numbers given to the bungalows are the serial numbers used in the text.

The letters represent the officers, adult relatives, and guests living (*i.e.*, occupying quarters) in the respective bungalows.

Individuals attacked in the original outbreak are shown in italics.

"E" "F" were the only individuals connected with the Regiment living in the hotel. There were of course other residents.

When these cases occurred "Poona Cantonment was practically free from intestinal disease." From the persons attacked it was evident that the cause of infection must be sought in some "esurient day" on which they had met to dine together. Such an opportunity for eating possibly infected oysters was to hand in the "dinner party at which twenty-two persons had been present" on January 6th, 1914. Those who did not eat the oysters did not suffer.

The "Summary" and "Diagram" give all necessary details; but it will be of interest to give an extract from Captain Keyworth's paper which shows the relation between the infections recorded and the antecedent antityphoid inoculation:—

"A glance down columns 3 and 4 of the table reveals the fact that only three persons 'I' 'S' and 'W' . . . were not protected," either by a previous attack of enteric fever or by protective vaccination.

"These three were all ill with continuous fever and they were the only ones of the whole series that had fever of any considerable duration. The protected suffered also but to quite a different degree. Thus the protection afforded by previous enteric or by inoculation was definite though only relative."

A report made by Major HARVEY, R.A.M.C., in connection with the "Poona" outbreak showed that, as regards Bombay oyster beds, "the grossest contamination was a matter of almost daily occurrence!"

J. H. T. W.

Summary of results in tabular form.

Serial letters.	Rank or Description.	Inoculated.	Previous Enteric.	Oysters on January 6th.	Diarrhoea.	Fever.	Agglutination *B. typhosus.*	Agglutination *B. Para A.*	Remarks.
A	Captain	—	+	+	—	—	+1/20	+ 20	.....
B	Wife of A	+ 1/12	—	—	—	—	+1/20	+1/20	.....
C	Colonel, brother of A	?	?	+	+	—	not exa	mined	Diarrhoea for 7 days commencing Jan. 7th } Sailed for England, Jan. 9th (C & D)
D	Wife of C	?	?	?	—	—	not exa	mined	
E	Colonel (Commandant)	+24/12	—	+	—	+	—	+1/200	10 days' fever, commencing January 29th. Blood culture 7th day negative.
F	Wife of E	+18/12	—	—	—	—	—	—	.....
G	Major	—	+	+	—	—	—	—	.....
H	Major	+ 6/12	—	+	—	—	—	—	Ill with fever and diarrhoea for 7 days in March 1914, probably infected from I.; not included in original outbreak.
I	Wife of H	—	—	+	—	+	ref exami	used nation.	Fever for 4 weeks commencing January 15th, ambulatory case of enteric or paratyphoid, refused treatment.
J	Major	+24/12	+	+	—	+	1/100	—	10 days low fever commencing January 26th, ambulatory case, never went sick.
K	Captain	—	+	+	—	—	—	—	.....
L	Wife of K	+ 3/12	—	+	—	—	+1/20	—	.....
M	Lady staying with L	+ 2/12	—	+	+	—	—	—	Mild dysentery for 10 days, commencing Jan. 7th.
N	Lady staying with L	+ 2/12	—	+	+	—	+1/100	—	Diarrhoea for 6 days commencing January 7th.
O	Captain	+ 1/12	—	+	+	—	+1/20	—	Slight diarrhoea on Jan. 7th and 8th.
P	Wife of O	+ 1/12	—	—	—	—	+1/20	—	.....
Q	Captain	+24/12	+	+	—	—	+1/40	—	Dyspepsia 7 days commencing January 22nd.
R	Sister of Q	+ 6/12	—	+	—	+	—	—	Fever for 10 days commencing January 29th; B. Faecalis Alkaligenes recovered from stools.
S	Captain	—	—	+	—	+	+1/200 —	—	Enteric of moderate severity commencing January 28th; B. Typhosus recovered from blood on 6th day.
T	Captain	+24/12	—	+	—	—	+1/20	—	.....
U	Subaltern	+24/12	—	+	+	—	+1/20	—	Diarrhoea for 3 days commencing January 7th.
V	Medical Officer	+18/12	—	+	+	—	+1/100 —	—	Diarrhoea for 4 days commencing January 7th.
W	Civilian resident in Poona	—	—	+	—	+	+1/40	—	Severe enteric commencing January 15th.

Note.—The numerals in column 3 represent fractions of a year since last inoculation or re-inoculation.

CHALMERS (Albert J.) & MACDONALD (Norman). **An Enteric-like Fever in the Anglo-Egyptian Sudan.**—*Lancet.* 1916. July 22. pp. 139–144.

The authors consider that they have discovered a new type of enteric fever with a new causative bacillus, to which they have given the name *B. khartoumensis* Chalmers and Macdonald 1916. Little is said about the disease, very much about the bacillus!

The following extracts from the authors' report will enable readers to form an opinion as to the value of the discovery.

The number of cases treated is not given, but the organism, regarded as a new species, was isolated from only three of them :—

An organism "which by agglutinating with the patient's serum during the later stages of the illness appeared to be the causal factor, while its cultural and biochemical reactions indicated that it belonged to the Typhoid-Colon Group."

"After a preliminary period of from 1-3 days during which the patient suffers from headache, constipation, and malaise, with marked (Chart 1) or slight fever (Chart 2), the febrile attack sets in gradually, being associated with marked constipation and headache and a disinclination for mental or bodily work, and with all the usual signs and symptoms of a mild attack of typhoid fever. . . . As no organism could be found in the blood it must be concluded that *no marked septicaemia* could have been present, by which of course it is not meant that large quantities of blood—e.g., 10 cc.—might not have shown an organism, but unfortunately it did not occur to us to use more than small quantities, 1 to 2 cc. of blood, as usual well diluted with broth."

"The mortality was nil." The bacillus was obtained from the faeces and at the end of 24 hours showed on Drigalski-Conradi plates "bluish clear dew-drop colonies varying in size and regular in outline lying between the typical colon colonies." "On Fawcus's medium they appeared at the end of 24 hours as clear colonies regular in outline and varying in size lying among the typical colon colonies."

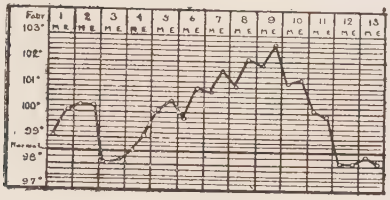
These colonies contained "non-motile, Gram-negative bacilli which fermented lactose in liquid media with production of acid and gas, and in subcultures produced red colonies on MacConkey's bile salt lactose agar." With the patients' serum this bacillus agglutinated "in dilution of 1 in 50 and less completely in 1 to 100. Eberth's bacillus and the paratyphoid bacilli were not agglutinated."

[This does not exclude the possibility that the bacillus is an atypical *B. paratyphosus* A, which even when typical always shows a very low titre with a patient's serum and often gives no reaction with such serum, although an undoubted A–bacillus, agglutinated by a specific serum, has been isolated by blood culture.]

"It agglutinated with a specific paratyphoid A serum in a dilution of 1 in 50"; 1 in 100 was feeble and in 1 in 1,000 absent. "As this serum completely agglutinated the laboratory strain of *B. paratyphosus* A up to 1 in 10,000 in one and a half hours and also completely agglutinated in dilution up to 1 in 5,000 and less completely 1 in 10,000 an organism giving the reactions of *B. paratyphosus* A, and recently isolated from a case of fever in Port Sudan, we conclude that it was in good condition!"

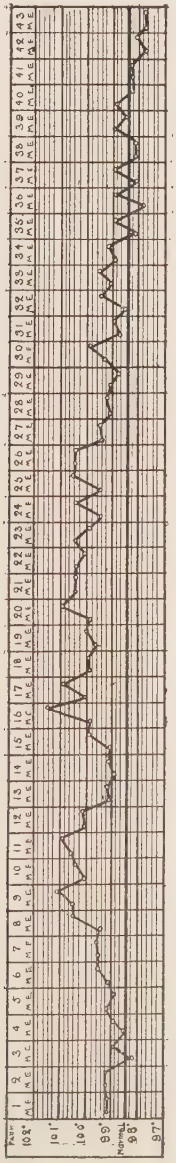
Morphology, staining conditions and biochemical reactions are given in great detail and the genealogies of many bacilli are graphically stated.

CHART 1.*



This chart illustrates the precursory fever which may occur before the real attack, and also a typical attack without a relapse.

CHART 2.*



In this chart there is but slight precursory fever, while the real attack ends on the fourteenth day and is followed by a relapse.

* Reproduced by permission from the *Lancet*.

[This bacillus and the disease it produces may be new as affirmed but so many atypical bacilli related to those of the genus *Enterica* and also to *Dysenteriae* and to *Coli* have been described that, before accepting the specific rank of *B. khartoumensis*, it would be well to wait until this report is confirmed by others (cf. SARRAILHE and CLUNET (2 notes); SVESTKA; ARCHIBALD, HADFIELD and others, *Bulletin* Vol. 8, pp. 73 & 89; also COURMONT, CHATTOT and PIERRETT, ARCHIBALD, HADFIELD and others (this Number). Clinically the disease resembles paratyphoid A fever.]

J. H. T. W.

von WILUCKI. **Paratyphus abdominalis B geheilt durch Bolus alba.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. June. Vol. 20. No. 12. pp. 265–267. With 2 charts.

In Vol. 19, No. 12 of the same journal for the year 1915, Dr. v. Wilucki had reported 33 cases of paratyphoid B infection which he treated with "Bolus alba" with good results. The doses given in those cases were:—150 gm. daily for the first few days, then 100 gm. three times a day for five days. Sufficient water was added to make the dose potable. As a rule the patients soon became accustomed to the taste; but in some cases it was necessary to give the drug in milk, tea or coffee. Occasionally the treatment produced constipation.

The case recorded in Vol. 20 occurred also on board S.M.S. "Posen," in February, 1916, and was treated in the same way with "Bolus alba." The effect produced was very marked in this case:—The temperature fell, the number of stools was reduced and on recovery the intestines were free from *Bacillus paratyphosus* B.

The sources of infection on the "Posen" which might have started the epidemic in 1915 were:—Water tanks; carriers (cooks, etc.); and the ship's dog whose dung contained *B. paratyphosus* B. The case reported in Vol. 20 was not followed by any others and Dr. v. Wilucki suggests that the infection in this instance may have come from the ship's dog. *B. paratyphosus* B is considered to be a possible cause of "distemper" in dogs, and the bacillus also lives in the dog's intestines as a saprophyte. The patient was a "sweeper" and it was his duty to remove, with other refuse, the dog's excrement. Harmless as a rule in the intestine of the dog the bacillus becomes harmful in a different environment, the human gut, where it produces toxins which are pathogenic. The bacillus does not change, but the chemical substances produced are different.

J. H. T. W.

COYON (AM.) & LEMIERRE (A.). **Valeur comparée du séro-diagnostic des fièvres typhoïdes et paratyphoïdes chez les sujets vaccinés et les non-vaccinés contre la fièvre typhoïde.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. July 27. 3 ser. Vol. 32. No. 25–26. pp. 1209–1221. With 8 charts.

This is an interesting record and worthy of notice although similar work has been done by others, mainly by macroscopic methods of diagnosis [see this *Bulletin*, WADE & McDANIEL; DYER, Vol. 6, p. 23; PORCELLI-TITONE; REISS, Vol. 7, pp. 46-47].

Coyon and Lemierre rely on a microscopic method on lines laid down by WIDAL and SICARD :—

"The mixtures of serum to be examined, and of emulsion in peptone water of bacillary cultures, of 24-hours growth on agar, are made, in progressively increased dilutions, in a series of watch glasses. One drop, taken from each glass and placed on a slide, can be examined during each minute of the experiment and compared with a drop of the control pure-culture. Below 1 : 100 the reaction is not considered positive unless produced during the first half-hour. Above 1 : 100 we only recognize the agglutinations that take place during the first two hours."

"This process enables one not only to measure the agglutination titre, but also to appreciate the rapidity of the massing of the microbes and the aspect of the clumps."

As the outcome of their investigations the authors arrive at the following conclusions :—

"1. The introduction of anti-typhoid vaccination has not diminished the practical value of serum-diagnosis by agglutination when applied to the diagnosis of typhoid and paratyphoid fevers."

"2. Microscopic sero-diagnosis and measurement of agglutination titres as used by Widal and Sicard remains the method of choice, capable of guarding against errors due to paradoxical or atypical agglutinations, generally rare."

"3. Anti-typhoid vaccination leaves in the serum of numerous individuals powers of agglutination with Eberth's bacillus, which may reach, even after a long period of time, a titre of 1 : 100 or even 1 : 200. It is only when the dilution is much greater than 1 : 200, and agglutination of high titre with *B. paratyphosus* A or *B. paratyphosus* B is absent, that we may conclude that vaccinated persons are suffering from an attack of typhoid fever."

"4. The persistence of such agglutination in vaccinated persons does not interfere with serum-diagnosis in patients attacked by paratyphoid infections."

"5. Blood culture, although giving a more reliable diagnosis than serum-diagnosis, is only available early and when a laboratory is within reach."

J. H. T. W.

GAUTIER (C.) & WEISSENBACH (R. J.). **Le diagnostic des infections typhiques et paratyphiques chez les vaccinés et les non-vaccinés, par la séro-réaction de Widal, valeur de l'épreuve de la saturation des agglutinines dans les cas d'agglutinations multiples.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. July 27. 3 ser. Vol. 32. No. 25–26. pp. 1344–1375.

Necessary as are the ordinary methods for diagnosis through the phenomena of agglutination the records are so numerous that much of the authors' work calls for no extended notice. On the other hand differentiation by saturation is a difficult and valuable process and new work is welcome [cf. BAINBRIDGE, "Milroy Lectures," *Lancet.* 1912. Vol. 1, pp. 705, 771 and 849].

It is not necessary to reproduce all the details, "tables" and analyses. Full references to previous work are given by the authors.

The chief conclusions are :—

"1. It is indispensable, in all cases, to investigate and to compare *the final titres* of the agglutinating power for each of the three germs T, A, B."

"2. In cases of multiple agglutinations, if the titres of the two or the three agglutinins are in the proportions of 1 : 6, 1 : 7 and above, an investigation of the final titre of agglutinating power is sufficient; the kind of agglutinin giving the highest titre indicates the species of infecting germ."

"On the other hand if the *dilution limits* of the agglutinins are in ratios of 1 : 5, 1 : 4 or approach equality, it may happen that the germ agglutinating most is not the infecting germ. It is the interpretation of such cases that authors find most difficult when they confine their efforts to the testing of final titres only. To avoid all risks of error thay have been led to reject all except high dilutions. They have thus lost the advantages of the serum-diagnosis method precisely in the periods most interesting to the physician:—at the beginning of the illness, if they have not made blood cultures, and in mild infections when blood culture is negative. It is necessary in such instances of multiple agglutinations, with ratios in the neighbourhood of 1 : 5, 1 : 4, etc., to have recourse to proof by the method of saturation of agglutinins. The determination of the *dilution limit* of the agglutinating power of the serum, after saturation if that be necessary, has a value which differs according to the germ in question, the period of disease at which the serum-diagnosis is made, and according to whether the patients are vaccinated or non-vaccinated individuals."

J. H. T. W.

COURMONT (Paul), CHATTOT & PIERRET (R.). **Le séro-diagnostic des infections paratyphiques.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. June 16. 3 ser. Vol. 32. No. 19–20. pp. 955–980.

One would think that the evidence in favour of specific agglutination was already sufficient; but it appears that there are still some who doubt. Such a one is M. RIST [Reference not given] who, having examined 216 cases, says:—"As showing that the bacillus of Eberth, or the paratyphoid A, or the paratyphoid B is the cause of a disease the serum-reaction is of no value."

The careful work done by Courmont and his colleagues was undertaken in order to refute the above statement.

"Clinical examination alone cannot differentiate typhoid and the paratyphoid fevers. It is necessary to add: blood culture and serum-diagnosis.

"Blood culture when positive is certain proof; but it has its difficulties:—"

"1. Blood culture is nearly always negative after a certain period of the illness; 2. in mild and abortive cases the bacillaemia is of brief duration."

[Time, therefore, is an important factor in successful blood culture, and this is also insisted on in a "Report" by ARCHIBALD, HADFIELD and others. [See above.] The medium in which the blood culture is made is also of importance, and Captain S. R. DOUGLAS, I.M.S. (retired) and Captain L. COLEBROOK, R.A.M.C. [*Lancet*, July 29, 1916] have reported on the value of broth containing trypsin.

In this connection it is only right to call attention to the work of S. W. COLE and H. ONSLOW (*Lancet*, July 1st, 1916).]

"Diagnosis by comparative agglutination of the three bacilli E, A, B, should be made concurrently with the blood culture, or when that is impossible."

The authors set a high standard and disregarded all agglutinations below 1 : 50 for *B. typhosus* and *B. paratyphosus* A, and below 1 : 100 for *B. paratyphosus* B.

Their conclusions are as follows:—

"The comparison of the results of positive blood culture and serum-diagnosis in 109 cases of typhoid or paratyphoid fever lead us to the following conclusions:—

"1. The serum-diagnosis of the paratyphoids by comparative agglutination of the bacilli A and B keeps all its value in subjects not vaccinated against those bacilli (even if they are vaccinated against Eberth's bacillus)

if our rules of technique and practice are followed (especially the use of bacilli of marked agglutinability and the search for agglutinations of high titres capable of showing predominance of specific agglutination).

"2. The sero-agglutination of Eberth's bacillus in vaccinated persons has no great diagnostic value; it must not be taken into account when appearing concurrently with sero-diagnostic appreciations of paratyphoids.

"3. The results of serum-diagnosis have been nearly always concordant with those of blood culture. The chances of error due to paradoxical agglutination of a bacillus not present in the infection have been extremely small; three cases only in 109 (2·8 p. 100), and in two of these cases agglutination subsequently appeared to rectify the possible error.

"4. Coagglutinations were nearly always absent, or were temporary, or greatly inferior to the agglutinations of the bacillus revealed by the blood culture. The repetition of the serum reactions with higher dilutions removed nearly always the possibility of mistakes.

"5. The case of paradoxical agglutination may sometimes be explained by a recent infection by a paratyphoid bacillus other than the one revealed by the blood culture (case of successive infection by the bacilli B and A). The agglutination is thus a faithful witness of infections recent or co-existent."

"6. The agglutination of the infecting bacillus rises especially at the end of the illness, and coagglutinations ordinarily disappear at this period; it is at this time that comparative serum-reactions will give the most valuable indications."

"7. Respective values of the agglutinations E, A, B:—

"(*a*) *Agglutination of bacillus A.*—It is often absent (33 p. 100) or retarded, but we have only encountered (starting from 1 : 50) two cases in 109 where it occurred other than with A in paratyphoid and then with a titre lower than that of the infecting bacillus. A positive serum reaction with A has a very great value, while its absence, by itself, does not disprove the presence of paratyphoid A. It even suggests paratyphoid A when the reaction is negative, since the agglutinations of E or B are nearly always positive at some time during the illness. The research should be continued into [and beyond] the convalescence.

"(b) *Agglutination of bacillus B.*—Exists nearly always in paratyphoid B (88 p. 100) and often at very high titres; but we have found it predominant during the course and especially at the beginning of some infections of E or A (3 cases in 109, or 2·8 p. 100 agglutination of B, starting from 1 : 100).

"(c) *Agglutination of Eberth's bacillus.*—In non-vaccinated persons the value of the reaction remains good; we have only found it in diseases due to Eberth's bacillus. In vaccinated persons it would give rise to frequent errors if given its full and ordinary value; it would have given us 33 p. 100 of error in cases of paratyphoid A, and 27 p. 100 with para- B a figure reduced to 9 p. 100 only, on repeating the serum reactions."

"8. *Application of serum diagnosis alone.*—It enabled us to make a diagnosis in 101 cases, say 78 p. 100 (24 typhoid fever, 25 para-A and 52 para-B)."

J. H. T. W.

GLYNN (Ernest) & LOWE (E. Cronin). **Serum Reactions of 300 Unselected Cases of "Enteric" with the Oxford Standard Agglutinable Cultures.**—*Lancet.* 1916. Aug. 5. pp. 222–227.

DREYER's technique was employed according to "Directions for the use of standard agglutinable cultures, Department of Pathology, University of Oxford, on behalf of the Medical Research Committee."

Readings were taken "in a cupboard, with a black background, containing an electric lamp," in which standard records can be made by day or night.

The chief "Conclusions" are as follows:—

"After making about 3,000 tests of these and other cases we find the emulsions most satisfactory, giving quite clear and definite readings, and the technique so simple that it can be easily mastered by an intelligent attendant. . . .

"The only practical difficulty—viz., that of obtaining sufficient blood—was overcome by instructing the ward sisters how to fill specially made Wright's capsules.

"Control sera of soldiers inoculated against typhoid, but suffering from dysentery or surgical diseases, failed to agglutinate either paratyphoid emulsions, but the serum of every convalescent, 12 in all, excreting paratyphoid A or paratyphoid B bacilli agglutinated the corresponding emulsion only in titres ranging from 25 to 250. . . .

"The remarkable diminution and frequent disappearance of the paratyphoid 'infection' agglutinins which usually occurred formed a marked contrast to the stationary typhoid 'inoculation' agglutinins. This is partly explained by supposing that the typhoid vaccines were made from strains of bacilli specially selected on account of their capacity to form quantities of 'inoculation' agglutinins.

"*Co-agglutination.*—(*a*) Between paratyphoid A and B or *vice versa* co-agglutination did not occur with the Oxford emulsions, in convalescence at any rate; only three sera out of 600 have agglutinated A and B simultaneously; in two paratyphoid vaccine had been used. (*b*) Typhoid infection or vaccine produced titres from 250 to 5,000 without agglutination of paratyphoid. (*c*) Paratyphoid B infection, though not paratyphoid A infection, certainly raised the titre of typhoid inoculation agglutinins. It was remarkable, however, that the paratyphoid B titre usually fell while the typhoid persisted, apparently the paratyphoid B infection stimulated the tissues already engaged in the formation of typhoid agglutinins to repeat the sudden rise and gradual fall which followed the typhoid vaccine.

"The paratyphoid A titre averaged a lower level than that of paratyphoid B after infection and after vaccine, partly perhaps because the paratyphoid A emulsions used to demonstrate the presence of agglutinins were relatively less sensitive. Consequently [as has been frequently noticed] a low paratyphoid A titre is the more significant; Dreyer, in fact, states that an agglutination of 1–10 paratyphoid A is diagnostic. . . .

"Our serological tests independently confirm what Archibald found by blood cultures—viz., that in the Eastern Mediterranean paratyphoid B infections were commoner than paratyphoid A until November [1915], after which the reverse obtained. This change in incidence was probably due to the introduction of paratyphoid A carriers with the battalions from India."

[The macroscopic method known as "Dreyer's method" has generally proved reliable and might be accepted as a standard for such sero-agglutinations. A simple, easy, microscopic method, workable almost anywhere, is that recommended by COLES—this *Bulletin*, Vol. 8, p. 102.] J. H. T. W.

NOBÉCOURT (P.) & PEYRE (E.). **Résultats des hémocultures pratiquées chez 375 malades du service des contagieux de F. . .**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. June 2. 3 ser. Vol. 32. No. 17–18. pp. 813–830.

Three hundred and seventy-five patients admitted to a hospital for infectious diseases were tested by blood culture for the presence of bacteria. 10 cc. of blood, taken from the median vein of the forearm, were added to 40 cc. bile-bouillon (1/3 bile). 152 were positive; 223 negative. Of the 152 positive results 142, when the bacilli were isolated and identified, showed:—23 *B. typhosus;* 79 *B. paratyphosus* A; and 40 *B. paratyphosus* B.

Among the cases that gave negative results there were patients suffering from typhoid and paratyphoid fevers as shown by clinical symptoms and agglutination tests. When bacilli were found in the blood they were identified by the following technical methods :—

"*B. typhosus* : mobile bacillus ; Gram-negative ; general cloud with wavy silky growth in bouillon ; no appreciable evolution of gas in glucose or lactose carbonated bouillon ; no bubble of gas, no discoloration, no fluorescence in glucose agar neutral red stab culture ; no gas, brown coloration in glucose agar with subacetate of lead ; agglutination with a specific serum."

Out of the 23 persons suffering from this disease and giving as stated a positive blood culture 15 had previously received anti-typhoid vaccine.

"*B. paratyphosus* A : motile bacillus ; Gram-negative ; general cloud with silky wavy colonies in bouillon ; evolution of gas in carbonate, glucose bouillon but not in lactose bouillon ; greenish to yellow tint in lower three-quarters of stab culture in glucose agar with neutral red [after a few days this colour is replaced by red showing a secondary acid reaction] ; production of gas but no darkening of glucose agar with acetate of lead ; agglutination by a specific serum."

"*B. paratyphosus* B : Differentiated from *B. paratyphosus* A by the appearance of a blackish colour in the glucose agar with sub-acetate of lead and by agglutination by a specific serum."

This bacillus causes a yellow colour with greenish fluorescence in the "neutral red" medium; the colour is permanent as *B. paratyphosus* B is an "alkaline" bacillus. With regard to *B. paratyphosus* A it would seem to differ from the other two members of the "Enterica" group in that it forms "Small reddish colonies" on Endo's fuchsin plates [cf. SVESTKA. *Bulletin*, Vol. 8, p. 99]. On Drigalski-Conradi "crystal-violet" plates all three show pale blue colonies.

J. H. T. W.

COSTA (Fernando). **L'hémoculture dans l'eau et l'hémoculture en bile dans le diagnostic de la fièvre typhoïde.**—*Arquivos Inst. Bact. Camara Pestana.*—1916. Vol. 4. No. 3. pp. 292–296.

This research was undertaken in order to compare the methods of CONRADI and KAYSER with the method recommended by GILDEMEISTER in 1910 :—

"The diagnosis of typhoid fever by bacteriological methods attained its maximum of perfection and certainty in 1905–1906 when Conradi first, and then Kayser, adopted culture media containing glycerinated bile, or bile simply sterilized."

"0·5 to 2·5 cc. of blood were taken from a patient and placed at once in a 5 cc. tube of sterilized ox bile incubated at 37° C. for 12 to 24 hours and then sown on plates [Drigalski, Endo or other], repeating the process 12 to 24 hours later if the first plates show no growth."

"Kayser published his first work on 125 cases with 100 per cent. positive results during the first week of the illness ; 60 per cent. in the second, 48 per cent. in the third and, finally, 33 per cent. in the fourth and fifth weeks."

Others repeated the experiments with similar results.

"In January 1910 Gildemeister proposed sowing the blood not in bile but in distilled water or even any ordinary water. The method consists in adding the freshly taken blood, or clot ground up minutely, to eight or ten times its volume of distilled water and shaking it forcibly. The tube is incubated at 37° C. and one hour later again forcibly shaken ; 12 to 24 hours later the fluid is sown on plates as in Kayser's method."

"The relative value of the two methods as resulting from our observations is even better shown when these are grouped according to the time at which the blood was taken. Here are the results by weekly periods :—

Direct Blood Culture.

	1st week (9 cases).		2nd week (13 cases).		3rd week (5 cases).	
	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.
In Bile ..	9	0	11	2	3	2
In Water .	7	2	9	4	2	3

Planting of Clot (24 *to* 48 *hours after extraction of blood*).

	1st week (6 cases).		2nd week (9 cases).		3rd week (2 cases).	
	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.
In Bile minutely divided .	4	2	8	1	2	0
In water minutely divided .	4	2	5	4	1	1

"Conclusion: Blood culture in sterilized distilled water or even in spring water, in the proportion of one part of blood to four of water, is an extremely practical method for bacteriological diagnosis of enteric and similar affections. Its results are, on the whole, inferior to those obtained by blood culture in bile."

J. H. T. W.

LABBÉ (Marcel) & CANAT (Georges). **La biliculture chez les typhiques.**—*C. R. Soc. Biol.* 1916. July 22. Vol. 79. No. 14. pp. 668–670.

Bile was obtained by aspiration from a number of patients suffering from one or other of the enteric fevers. When incubated cultures of *B. typhosus* or one or other of the paratyphoid bacilli appeared.

The authors say that "bile-culture offered a diagnostic method of considerable value in three cases when blood culture, copro-culture and serum-diagnosis had failed."

J. H. T. W.

ACHARD (Ch.). **Expériences sur l'infection mixte par le bacille d'Eberth et le bacille paratyphique B.** *C. R. Soc. Biol.* 1916. July 29. Vol. 79. No. 15. pp. 751–752.

The author recounts some experiments on rabbits and guinea-pigs with intravenous injections of mixed cultures of *B. typhosus* and *B. paratyphosus* B, 1/2 or 3/4 of the former to 1/2 or 1/4 of the latter. When the animals were killed blood from the heart was planted in bouillon. From the guinea-pigs bile was also taken and cultures were obtained. The bacilli grown were identified by use of "Neutral-red, glucose agar," and "glucose bouillon in anaerobic tubes." It was then found that in every case the bacillus obtained was *B. paratyphosus* B, even in cases where the injected material contained only 1/4 of those germs.

J. H. T. W.

TIDY (H. L.) & DUNN (I. P. S.). **On the Differential Bactericidal Values of Malachite and Brilliant Green for the Typhoid-Coli Group.** —*Jl. Roy. Army Med. Corps.* 1916. Oct. Vol. 27. No. 4. pp. 482–494.

It will suffice to give the outlines of this long paper, full of technical details.

The authors, officers in the R.A.M.C., discuss the difficulties present in all methods of isolating *B. typhosus*, which lie mainly in the power which *B. coli* exercises in suppression of *B. typhosus*. Their researches show that when brilliant green is added to the culture media it induces "a pure growth of *B. typhosus*; in the absence of the dye a preponderance of *B. coli* in the proportion of three to one was obtained."

"Comparing these results with those afforded by an identical series of experiments with malachite green, the inferiority of the latter to brilliant green as an enhancing agent was manifest." Similar comparative researches were carried out with *B. paratyphosus* A and *B. paratyphosus* B. "In fifteen cases *B. paratyphosus* A, and in eleven cases *B. paratyphosus* B was isolated from brilliant green when the broth cultures were negative."

J. H. T. W.

WHITHAM (Jay D.). **Paratyphoid Infections.**—*Milit. Surgeon.* 1916. Nov. Vol. 39. No. 5. pp. 491–496.

In this record the author, a captain in the U.S. Army Medical Corps, gives us a general review of present-day knowledge of the infections due to bacilli of the Enterica group known as *B. paratyphosus* A, and *B. paratyphosus* B.

The early historical paragraphs lead up to the bacilli, their nature and properties, and show that they "occupy an intermediate position between typhoid and colon bacilli." As regards their pathogenicity for animals the author writes :—

"Typhoid bacilli are not very pathogenic for guinea-pigs and mice, but paratyphoid organisms are extremely so, one-hundredth of a loopful of *B. paratyphosus* causing death when injected intraperitoneally. Of the two paratyphoid organisms the B is much more common and wide-spread."

The morbid anatomy resembles that found in typhoid infections, but with certain differences. "Thus the large intestine is more extensively involved than is ordinarily the case with enteric [typhoid] fever."

A list of the symptoms is given according to percentage :—

1. Headache	85%
2. Diarrhoea	55%
3. General abdominal pain	35%
4. Aching in the limbs	30%
5. Mild intermittent shivering	25%
6. Extreme general weakness	25%
7. Backache	25%
8. Epistaxis	20%

Referring to the methods of infection the author writes :—

"The *modus operandi* of infection . . . resembles typhoid . . . the organisms escape from the bodies of carriers chiefly by means of the fæces and can infect food and drink, directly or indirectly, through the agency of

flies. So by means of infected hands or contaminated food, the organisms gain entrance to the human host. The more important vehicles are water, milk, oysters, shellfish, dried fish and uncooked vegetables. Dust, and clothing infected with human excrement, must also play a prominent rôle in the transmission of the disease."

Protective vaccines are accepted as in the case of typhoid fever and the author concludes that the treatment beneficial in typhoid fever is also the most useful in cases of infection due to the paratyphoid bacilli.

J. H. T. W.

MACADAM (William). **Thrombosis of the Cerebral Arteries in Paratyphoid B.**—*Jl. Roy. Army Med. Corps.* 1916. Oct. Vol. 27. No. 4. pp. 499–500.

The chief features of this striking case are briefly as follows :—

Australian soldier, aged 25, admitted into Netley hospital, from Gallipoli, September 26th, 1915, in the "typhoid state," semi-conscious ; Cerebral symptoms of six days' duration ; temperature, while on the hospital ship, ranged between 102° F. and 104° F. Complete right-sided hemiplegia and right facial paralysis ; incontinence of urine and faeces. Died two days after admission.

Necropsy. Dura mater adherent and vessels congested. At the base of the brain thrombosis at the upper end of the left internal carotid artery extending into the middle meningeal and its lenticulo-optic and lenticulo-striate branches. An area of softening, of reddish-white colour, the size of a pigeon's egg, involved the internal capsule and lenticular nucleus. On the right side there was thrombosis only in the cortical branches of the middle meningeal. Spleen four times its normal size, with large swellings at the poles due to haemorrhagic infarcts showing purulent softening. Small intestines congested. Ulceration slight and confined to Peyer's patches of the lowest three feet of the ileum. Large intestine normal except for hyperaemia of caecum. "The nature of the infection was confirmed bacteriologically at the autopsy by the isolation in pure culture from the spleen of a Gram-negative bacillus with all the cultural and agglutinating characters of *Bacillus paratyphosus* B."

J. H. T. W.

COURMONT (Paul) & CHATTOT. **Succession chez un même sujet des septicémies paratyphoïdes B et A et des séro-réactions agglutinantes spécifiques.**—*C. R. Soc. Biol.* 1916. June 17. Vol. 79. No. 12. pp. 567–569.

Accepting the proposition that, although such cases are rare, any one person may be successively infected by *B. typhosus*, *B. paratyphosus* A and *B. paratyphosus* B, the authors record a case of a man, vaccinated against the typhoid bacillus, who suffered from an attack of paratyphoid B fever followed, during convalescence, by infection, and fever, due to *B. paratyphosus* A :—

"G. –25 years of age, vaccinated during February 1915 against Eberth's bacillus (four inoculations).

"1*st infection.*—Duration of the fever from the 13th August to the 15th September, 1915 (32 days). Course of fever fairly mild, with maximum temperature 39·6° C. Recovered. Blood culture positive on the 17th day (1st September) :—*B. paratyphosus* B.

"*2nd infection.*—Duration of the fever from the 19th to the 28th October (10 days). Course of fever acute, short; maximum 40° C. during two days. Blood culture, positive on the 6th day (25th October):—*B. paratyphosus* A."

The bacilli were identified by cultures and by agglutination with specific sera.

Agglutinating Reaction with the blood of the Patient:—

	Eberth.	Para A.	Para B.
1st infection (Para B) 17th day 1st Sept. ..	+100	0	+500
2nd „ (Para A) 6th day, 25th Oct. ..	+ 50	0	+100
„ „ 8th day of normal temperature (5th November) ..	0	+400	0

If we accept the above results as correct and free from technical error they are worthy of thought and of further research. The work done upon "agglutinins" is by no means finished. The authors admit that the reactions observed are atypical and they refer to a "paper" by Major SACQUÉPÉE of the French "A.M.C." [*Bulletins et Memoires de la Société Médicale des Hôpitaux de Paris*, 1916, No. 11–12, p. 443] in which other paradoxical reactions are recorded. Facts by all means! But we want also explanations. We want to know why an old fact acquaintance turns up, not "four-square" as we knew it but with a small fifth side added. It is variation in form with modification in function. But why? A guess may be correct but it is not safe as a foundation for practice. J. H. T. W.

OLMER (D.) & VOISIN (Roger). **La pression arterielle au cours des fièvres typhoïdes éberthiennes et paratyphiques de l'épidemie de guerre 1915.**—*Bull. et Mém. Soc. Méd. des Hôpit. de Paris.* 1916. July 27. 3 ser. Vol. 32. No. 25–26. pp. 1265–1282. With 10 charts.

These investigations of the arterial pressure in enteric fevers have led to the following practical conclusions:—

"1. The diminution in arterial pressure, but especially the minimum pressure in typhoid fevers, is constant in so much that it may have a certain diagnostic value."

"2. During the 'typhoid state' a marked decrease of pressure, especially of the maximum, foretells some complication and causes a suspicion of heart-muscle failure."

"3. On the other hand a sudden rise of the maximum foretells the appearance of intestinal haemorrhage. When defervescence has begun it may announce a relapse."

"4. It would be of importance, during an attack of typhoid fever, not to be content with the pulse count only, when that appears to fluctuate, but to search for prognostic and therapeutic indications using arterial tension as a guide."

"5. There exist, in fact, outside myocardic syndromes forms of hypotension evolving slowly and out of sight, without rise of temperature, without apparent complications, without modification of the number or the regularity of the pulse beats."

"These forms should be sought for with the greatest care, for it is these, as we believe, that lead in serious cases to sudden death; *they are brief and sudden forms of suprarenal insufficiency.*"

"6. The recognition of a marked arterial hypo-tension necessitates treatment with the suprarenal hormone (capsules or injections of adrenalin). Subcutaneous injections of adrenalin are the most efficacious."

J. H. T. W.

WHITTINGTON (T. H.). **A Report on the Use of Stock Vaccine in Infection by the *Bacillus typhosus*, with Analysis of Two Hundred and Thirty Cases.**—*Jl. Roy. Army Med. Corps.* 1916. Oct. Vol. 27. No. 4. pp. 422–444. With 12 charts.

This Report by Lt. T. H. Whittington, R.A.M.C., is important when compared with records in which a favourable view is taken of the effects of stock vaccines in the treatment of infection by the *Bacillus typhosus* [cf. MACARTHUR, *Bulletin* Vol. 6, p. 18; PAULICEK, LOEWY and others, Vol. 7, No. 1]. As will be seen from the following "Summary" Lt. Whittington was inclined to consider these "vaccines" of some value:—

"In the total vaccinated cases there were twenty-nine in which it appeared that vaccine had a definite good influence. Of these, twenty belonged to Classes 3 and 4, i.e., to those classes in which the prognosis is good. In other words 'good results' are more often obtained where good results can be expected by ordinary methods of treatment alone. On the other hand, the mortality rate and the average length of fever in these classes was slightly worse among the cases who had vaccine.

"Among the cases belonging to Classes 1 and 2, in which the vaccine appeared to do good, none had severe lung involvement. Those cases which had much bronchitis or broncho-pneumonia (the average severe case) ran the severe course which is usual, and vaccine appeared to be of no avail. To say that, if the average severity of the cases treated had been less, the vaccine would have had better results, is merely to say, I think, that the cases would then have done better anyhow. From all this it would appear: (*a*) That it is just those cases in which the physician so much requires help that vaccine is so disappointing; (*b*) that vaccine neither shortens the fever nor reduces the number of complications in even that class of case which is likely to do well; (*c*) that there is a decided suspicion that vaccine increases the incidence of haemorrhage.

"The conclusion, therefore, is that the use of stock vaccine in typhoid fever cannot be recommended as a routine treatment. I should add that these conclusions are largely contrary to the impressions which I received during the treatment of the earlier cases. I had not then seen a sufficient number of similar cases which did well without vaccine, and being rather biased in its favour I gave undeserved credit to this treatment."

Two hundred and thirty cases of *B. typhosus* infection were divided into 115 test cases and 115 controls. In each group 15 patients had previously received protective inoculation. The cases were arranged in Classes according to severity.

Class 1.—32 cases very severe and very toxic.

Class 2.—86 cases, severe and toxic.

Class 3.—56 cases of moderate severity.

Class 4.—44 cases, moderately severe, but quite non-toxic.

Class 5.—12 mild cases.

In 205 cases *B. typhosus* was isolated. "The remaining 25 cases . . . were identified by the fact that their serum agglutinated the *B. typhosus* before vaccine was given, and as all were uninoculated this seems sufficient."

The original paper contains full details of the cases, mortality, etc.

J. H. T. W.

PETZETAKIS. **Vaccinothérapie antityphoïdique intraveineuse.** — *C. R. Soc. Biol.* 1916. July 22. Vol. 79. No. 14. pp. 655–656. With 2 charts.

The author used, with success, a "heated vaccine" containing 100,000,000 bacilli per cc. and injected doses of 0·25 to 0·5 cc. as occasion required. If he had referred even to such literature as is noticed in this *Bulletin* he would have found that the treatment of enteric fevers by means of intravenous injection of vaccines has previously been recorded :—this *Bulletin*, Vol. 6, No. 1 (ICHIKAWA); and Vol. 7, No. 1 (REIBMAYR). J. H. T. W.

YACISAWA (M.). **La vaccination antityphoïdique dans l'armée japonaise.**—*Paris Méd.* 1916. May 27. Vol. 6. No. 22. pp. 490–492.

In September 1908 antityphoid vaccine was applied for the first time to check an epidemic in the Japanese Army. Since that time the number of individuals protected by inoculation has increased yearly. Inoculation is not compulsory; nevertheless, since December 1910, almost all the recruits have been vaccinated. Soldiers with long service have, as a rule, been re-vaccinated yearly. The vaccine used is prepared by the method of Pfeiffer-Kolle, with slight modification.

Since 1910 two doses of protective vaccine have been given to each man: (1) 1 to 2 mgm. microbes; (2) 2 to 3 mgm. microbes. Occasionally a third dose has been given: 3 to 4 mgm.

Between 1897 and 1903, that is between the period of the Sino-Japanese war and the Russo-Japanese war, there was no sensible increase in the cases of enteric fevers. The average annual sick-rate was 629; the death-rate 121; or 5 per 1,000 and 1 per 1,000.

After the Russo-Japanese war there was a sudden rise in the number of enteric cases, especially during 1907. "We then had 1,375 cases with 218 deaths. The sick-rate was 8 per 1,000; the death-rate 1·3 per 1,000." After protective vaccination was introduced the sick-rate sank to 0·7 per 1,000 and the death-rate to 0·08 per 1,000.

The sick-rate and mortality rate from 1908 to 1912 among the inoculated, as compared with the uninoculated, are well shown in the following table :—

	Effectives (Daily average).		Number of Cases.		Deaths.		Per thousand. Cases.		Deaths.	
	Vaccinated.	Unvaccinated.	Vac.	Unvac.	Vac.	Unvac.	Vac.	Unvac.	Vac.	Unvac.
908	4,459	188,881	—	1,169	—	180	—	5·9	—	1·0
909	11,448	189,897	10	760	—	121	0·9	4·0	—	0·6
910	113,874	89,369	136	519	19	71	1·2	5·8	0·2	0·8
911	203,928	22,740	118	71	26	11	0·6	3·1	0·1	0·5
912	203,570	15,646	148	74	18	18	0·7	4·7	0·1	1·2
otal	563,370	506,533	412	2,533	63	401	0·7	5·0	0·1	0·8

Note.—Soldiers vaccinated once only are considered as unprotected. Soldiers not carefully examined after inoculation are not included in the above statistics.

The author concludes from careful examination of typhoid and paratyphoid fever cases that :—

(1) "Our experience shows that antityphoid vaccination acts favourably not only on the sick-rate but also on the gravity of the malady."

(2) "The protective power of the inoculation lasts for about one year and protection is greater when inoculation is frequently repeated." [cf. SCHWARZ, *Bulletin* Vol. 3, p. 98, and FILDES, see above.]

In a foot-note the author states that soldiers of the Japanese army are now protected against paratyphoid fevers by means of a polyvalent vaccine.

J. H. T. W.

MAGNAN (A.). **La vaccination contre les fièvres paratyphoïdes A et B.** —*C. R. Acad. Sci.* 1916. Mar. 27. Vol. 162. No. 13. pp. 484–486.

14,451 men received, with an interval of eight days, two injections of a vaccine containing the two paratyphoid bacilli. The first injection 1·5cc. ; the second 2 cc. The usual precautions were ordered. Certain of the men disregarded them and suffered accordingly ! M. Magnan's final paragraph is as follows :—

"Thanks to the initiative of the Medical Inspector, Principal Medical Officer of Health to an army, I have practised antiparatyphoid vaccinations in four regiments of that army. As to three of those regiments, the reactions were insignificant, none severe. In one regiment, reactions were more marked, but this is explained by the large number of men in the incubation stage of paratyphoid B fever, which prevailed in epidemic form, who received their injection at a time when they were already infected by the bacillus."

[This is an interesting record, showing as in other instances that a "vaccine" will not check an infection already installed. It may, indeed, precipitate the oncoming attack.]

J. H. T. W.

GRIXONI (Giovanni). **Febbre tifoide e vaccinazione antitifica.—Conferenza tenuta all' Associazione Sanitaria Milanese il 18 marzo 1915.** [Typhoid Fever and Antityphoid Vaccination.]—*Attualità Med.* 1916. May. Vol. 4. No. 5. pp. 301–335. With 13 text figs.

Major Grixoni, professor of military sanitation, has compiled a most useful paper giving the results of his enquiries into the value of antityphoid vaccine for prophylactic purposes and for the treatment of typhoid fever. The chief points with which the paper deals are as follows : —1. Typhoid fever in Italy, with charts showing mortality as compared with "Malaria" and Cholera. The death-rate among the civil population and in the army is compared. 2. The principles of anti-typhoid vaccination, the kinds of vaccine in use and the doses usually given. 3. The prophylactic value of the vaccination. Tables comparing death-rate among vaccinated and unvaccinated are given showing, on charts, figures for the British Army in India, the "U.S.A." army and portions of the Italian army. 4. The theory and practice of the vaccination. 5. The antityphoid vaccination in war. 6. The therapeutic value of the vaccine. All the professor's researches point to the inestimable value of anti-typhoid and anti paratyphoid vaccines.

J. H. T. W.

HOWELL (Katharine). **Observations on the Production of Antibodies after Antityphoid Inoculation.**—*Jl. Infect. Dis.* 1916. July. Vol. 19. No. 1. pp. 63–68.

These "Observations" might serve as a model for a certain type of worker, so intent on his own inventions that he cannot find space in which to give credit to others. The author reviews the literature of the subjects with which she deals, gives to the labourer his reward, and supplies full bibliographical references.

The following extracts from Miss Howell's "Observations" give the main findings:—

"Two healthy men . . . received three subcutaneous inoculations of U.S. Army typhoid prophylactic vaccine at 8 and 10-day intervals. The first dose was 0·5 cc. (500 millions), the 2nd and 3rd doses were 1 cc. (1,000 millions) each. No. 1 had a moderately severe local reaction, and slight constitutional symptoms . . . for 24 hours after the 1st and 2nd inoculations. About three hours after the third injection a very severe general reaction came on and lasted for from 24 to 48 hours. No. 2 had moderately severe local reactions after each injection, but practically no constitutional symptoms. Blood was collected aseptically from each patient at 2- or 3-day intervals for five weeks, then at longer intervals. The sera were withdrawn and inactivated by heating at 56° C. for 30 minutes."

Agglutinin.

"The microscopic method was used with inactive sera and a killed suspension of a highly agglutinable typhoid strain in normal salt solution. The tubes were incubated at 37° C. for 2 hours, then kept in an ice-box overnight and readings made in the morning."

No. 1:—No typhoid agglutinins before inoculation; three days after the first injection 1 : 40, 19 days 1 : 640; 60 days 1 : 2,560, the highest point.

Normal serum from No. 2 agglutinated typhoid bacilli diluted to 1 : 10. Five days after the first injection the titre was 1 : 40; 19 days 1 : 160; 63 days 1 : 5,000; on the 134th day the titre had fallen to 1 : 80.

In each case there was a slight fall after each injection.

Opsonins.

"Estimation was made by diluting the serum to the point of opsonic extinction. The dilution in which 50 leucocytes had the same percentage of cells taking part in phagocytosis as a normal control with salt solution, was considered the point of extinction. Varying dilutions of inactive sera, human leucocytes, and killed typhoid bacteria were incubated in capillary tubes at 37° C. for 15 minutes. A film was made from each tube, stained, and the number of leucocytes taking part in phagocytosis observed."

No. 1:—almost immediate rise; 3rd day titre 1 : 30; 1 : 20 on the 5th and 1 : 240 on the 10th; slight negative phase after 2nd and 3rd inoculations. From the 33rd to the last observation on the 60th day the titre remained 1 : 240.

No. 2:—Almost immediate rise; height of curve, reached on 21st day, was 1 : 480; remained 1 : 240 from 26th to 113th day; then fell to 1 : 120 on the 134th day.

Bacteriolysin.

"0·0125 cc. fresh guinea-pig serum, while having in itself little or no bactericidal effect, was sufficient to re-activate a normal inactive serum. One tenth cubic centimeter of a 1 : 12 dilution of normal re-activated serum, plated after a 3-hour incubation at 37° C. with 0·02 cc. of a typhoid suspension, gave approximately sterile plates. The typhoid suspension was of such titre that 0·1 cc. of 0·02 cc. typhoid suspension in 0·6 cc. of broth plated at once gave from 500 to 600 colonies per plate. . . . Varying dilutions of each [human] serum were placed in tubes and a fixed amount of fresh guinea-pig serum (0·0125 cc.) and of typhoid suspension (0·02 cc.)

added to each tube. For each dilution a control tube containing a corresponding amount of inactive serum and of typhoid suspension was set up. Two other controls were also used: one of typhoid bacilli, fresh guinea-pig serum, and broth; the other of typhoid bacilli and broth only. From each of these tubes 0·1 cc. was plated on agar at once, in order to determine whether or not the colony counts from all the tubes showed the anticipated similarity. The tubes were then incubated three hours at 37° C. and again 0·1 cc. from each was plated. Counts of colonies were made after a 24-hour incubation. The highest dilution of active serum that showed a markedly lower count than the corresponding serum control, was considered to show the amount of bacteriolysin produced. The plates made at once had from 500 to 600 colonies per plate. After a 3-hour incubation the control plates . . . contained 1,000 or more colonies. The plates from the reactivated serum varied from sterility to 1,000 or more colonies per plate.

"In both Nos. 1 and 2 the titre of the sera before the antityphoid inoculation was 1 : 48."

"The highest titre reached in No. 1 was 1 : 384, 30 days after the first injection of vaccine"; the same on the 60th day.

"No. 2—1 : 384 on the 26th day; 1 : 96 on the 113th day and 1 : 48 [normal] on the 134th day."

Complement Fixation.

Technique that of the Wassermann test (one tenth method) "Complement-fixation was obtained in No. 1 on the 14th day and was most marked on the 25th day. In No. 2 fixation was obtained on the 17th day and was most marked from the 29th to the 63rd day after which the power of fixation decreased, and was wholly lost on the 124th day."

J. H. T. W.

British Medical Journal. 1916. July 29. pp. 154–155.—"**The Enterica Group.**"

Under the above "heading" we find recorded the proceedings of a meeting of the "Anzac Medical Society," at Cairo.

The chief paper, already noticed in the August issue of the *Bulletin*, was contributed by Lt.-Col. Walter Summons. The discussion, which followed the reading of that report, dealt with the enteric fevers and not with questions concerning nomenclature. It contains nothing new. [To add the term "Enterica group," to a sufficiently unsatisfactory nomenclature does not simplify the work of classification. Why not, when writing, or speaking of the members of the enteric group of bacilli, adopt the generic name, *Enterica typhosa* and the other specific names already suggested for the paratyphoid bacilli? They are simple and scientific, and link the enteric fevers to their causative organisms.]

J. H. T. W.

Castellani (Aldo). **Enteric and Typhoid: a Point in Nomenclature.** [Correspondence.]—*Lancet.* 1916. Nov. 25. p. 920,

In this letter Dr. Castellani points out that the term "Enteric" as an inclusive title for the typhoid and paratyphoid infections was used in the 2nd edition of the "Manual of Tropical Medicine," the joint work of Dr. Chalmers and the writer. [The term is now generally used and marks an advance along the path of scientific classification.]

J. H. T. W.

SANARELLI (G.). **Sullo sviluppo autogeno delle infezioni tifiche e paratifiche.** [The Autogenous Development of Typhoid and Paratyphoid Infection.]—*Ann. d'Igiene.* 1916. July 31. Vol. 26. No. 7. pp. 459–474.

The first part of this essay is retrospective reviewing the history of enteric fevers from 1811 to the present day. Prof. Sanarelli next states the proposition on which his theory is founded :—Typhoid and other enteric fevers are not primary intestinal infections spreading from that focus to the system generally ; they are, on the contrary, infections of the blood and lymph with a secondary destructive effect on the cells and epithelium of the gut. The enteric infections alone are not the whole cause of the illness which follows. Their toxins are supposed to act upon the *B. coli* causing it to become an additional infecting agent ; and the theory of ROUX and RODET (Sur les relations du *B. coli communis* avec le B. d'Eberth et avec la fièvre typhoïde—*Soc. de Biologie*, 21 fevr. 1890) is quoted :—" The possibility that the coli- bacillus may be a saphrophytic form of the typhoid bacillus."

The author next discusses the action of " gases (sewer gas) " " chemical agents " and " cold and damp " on bacilli found generally in the intestinal flora of man and animals showing that they may become virulent under certain conditions. White rats were submitted to currents of " putrid gas." They died in two to ten days with marked enteritis, no other bacteria being present except the usual intestinal flora, which more or less resembles that of man.

As a further example METCHNIKOFFS' work on *B. proteus* is mentioned. It has been quoted as the cause of infantile and other diarrhoea but it is a " ubiquitous germ found constantly in man and in the intestines of domestic animals." It cannot therefore, unless roused to virulence by some agent, be the cause of these diarrhoeas. The author finds that the paratyphoid bacilli exist in the atmosphere, in food, in water and in the intestines of men apparently in good health. He further states that while antityphoid vaccination reduces the number of cases of Enteric fever due to *B. typhosus* it may even favour the appearance of diseases due to the paratyphoid bacilli. Finally Professor Sanarelli writes :—" Abundant food of good quality and the suppression of excesses and unnecessary fatigue especially in time of war represent the principal benefits of prophylaxis against infectious diseases, but, most particularly, against the autogenous development of intestinal infection of a typhoid type."

J. H. T. W.

SLEEPING SICKNESS.

CHALMERS (Albert J.) & O'FARRELL (W. R.). **Measurements of Dutton and Todd's Gambia Strain of *Trypanosoma gambiense* Dutton 1902.** —*Jl. Trop. Med. & Hyg.* 1916. Aug. 15. Vol. 19. No. 16. pp. 189–194. With 1 plate and 5 charts.

This paper is the second of a series dealing with trypanosomes studied in the Khartoum laboratories. The first note [see this *Bulletin*, Vol. 4, p. 500] related to the type of trypanosome obtained from cases of sleeping sickness occuring in the Lado Enclave of the Anglo-Egyptian Sudan. In this the authors concluded that the organism was identical with that found in cases of sleeping sickness in Uganda and the Congo, but they were unwilling to consider it to be the same species as that described by DUTTON in 1902, because there was not sufficient information available as to the specific characters of that strain.

In the present note observations on the original Gambia strain of DUTTON & TODD are recorded. The material consisted of the original slides made by DUTTON from the first case (Mr. K.) of human trypanosomiasis discovered by him in the Gambia, and also blood films made from a rat inoculated from the second European case (Mr. Q.) of human trypanosomiasis observed by DUTTON & TODD. These slides were sent to the authors by Professor TODD.

Unfortunately, the number of trypanosomes present on the slides of DUTTON's original case was much too small to allow of the measurement of 1,000 non-dividing individuals, but a photograph of one of the long forms is given. The slides from the rat contained, however, numerous parasites and the authors measured 1,000 non-dividing individuals. The result is set forth in tables and a chart. The minimum length was 15 microns and the maximum 36·5. The breadth varied from 1·5 to 3 microns. The average length of 1,000 individuals was 26·1 microns. The general appearance of the trypanosome is illustrated by micro-photographs: long, intermediate and short forms are shown. No approach to posterior nuclear forms was seen.

The measurements of DUTTON & TODD's strain were compared with those given by :—

1. DUTTON for the original strain,
2. BRUCE for the Uganda strain,
3. STEPHENS & FANTHAM for the Congo strain,
4. The author for the Lado strain.

The conclusions are :—

"In the conclusions which we drew at the end of our previous paper we wrote as follows :—

"'There being no data, that we know of, to compare these strains with *T. gambiense* Dutton 1902 we are of the opinion that, at all events provisionally, it would be safer to keep the name *Trypanosoma castellanii* Kruse 1903 for these strains until more light is thrown upon the complicated problem of: What is *Trypanosoma gambiense* Dutton 1902?'

"We now consider that the measurements given above afford sufficient evidence to conclude that the causal agent of sleeping sickness in Uganda, the Congo, the Lado of the Anglo-Egyptian Sudan, Principe, and the Gambia belongs to one and the same species, viz, *T. gambiense* Dutton 1902."

W. Yorke.

BASSETT-SMITH (P. W.) & MANGHAM (S.). **Forms of Fever in the West African Expeditionary Force.**—*Jl. Roy. Naval Med. Serv.* 1916. Oct. Vol. 2. No. 4. pp. 454–463. With 3 charts, 1 plate & 1 fig.

Malaria was one of the main causes of fever amongst the naval ratings and marines landed with the West African Expeditionary Force in the Cameroons; the infection was generally of the malignant tertian type, but in some cases quartan parasites were found. Other cases of fever were more difficult to explain. Malarial parasites were not found and quinine had no influence on the pyrexia.

Certain of the pyrexial cases, with or without malarial infection, were peculiar in having a very marked eosinophilia for which no cause could be found. One of these was found to be infected with trypanosomiasis; practically the whole of the present paper is a record of observations made upon this case.

The patient was ashore for ten months, first on the Niang River and later on the Campo. He was frequently bitten by tsetse flies. Trypanosomes were found in the blood on the 17th December, 1915. He had one injection of salvarsan. On the voyage home quinine was given.

On admittance to the Seaman's Hospital in March, 1916, the patient was debilitated, anaemic, depressed mentally, had lost much weight and suffered from irregular attacks of fever. There was no adenitis, no hyperaesthesia, no tremors and no rash. Other details are given. A high eosinophilia was constantly present, whilst trypanosomes were found from time to time. The course of the disease and the treatment administered are described in full. From March 4 to April 10 atoxyl was given in doses of five grains intramuscularly every third day and also four subcutaneous injections of oxide of antimony (MARTINDALE). This course of treatment controlled neither the fever nor the trypanosomes in the peripheral blood. On April 10 there was a great outburst of trypanosomes and antimony was given intravenously. This was followed by increasing doses of antimony subcutaneously and atoxyl on alternate weeks. The result was still very unsatisfactory; the gradual rise in the successive trypanosome outbursts was very marked up to June 4. The organism appeared to be entirely atoxyl resistant, though the patient was gradually improving in condition. From June 5 until the time of writing intravenous treatment only was used, at first galyl ·35 gr. every week, and later alternately with intravenous injections of antimony oxide (MARTINDALE'S) in doses of 1½ drm. or ·15 gr.

The authors state that the alternate use of intravenous injections of galyl and antimony caused a steady and marked improvement in temperature, trypanosome count and the patient's condition and further that a successful result is not impossible if the treatment can be continued.

Attention is drawn to the cylical outbursts of trypanosomes in the peripheral blood, which occurred about every fifth day.

Numerous differential leucocyte counts were made and the proportion of polymorphonuclear and eosinophil leucocytes together with the variation of temperature and number of trypanosomes in the peripheral blood are given in charts. The curve representing the

polymorphonuclears showed frequent and large excursions corresponding, as a rule, with the trypanosome curve. The eosinophils were relatively very numerous during the first three months; there was always a marked fall about the time of a rise in the trypanosome curve; the lowest eosinophil count was at the time of the highest trypanosome count. No autoagglutination of the patient's red cells was noted. An account of the morphology of the trypanosome is given; it differs in no respect from *T. gambiense*. The difficulty in obtaining animal infections and the mild symptoms are suggestive of *T. nigeriense*.

In conclusion the authors write that they recommend that all cases with a marked eosinophilia for which no cause can be determined coming from the Cameroon region be looked upon as possible cases of trypanosomiasis.*

The condition of the patient is still excellent. W. Y.

KOPKE (Ayres). **Estudo da doenca do sôno. Memoria premiada no concurso de 1915 e apresentada sob a divisa:** *Therapia Sterilisans Magna.* [A Study of Sleeping Sickness. A Prize Essay presented at the Competition of 1915, in the Section: *Therapia Sterilisans Magna.*]—Sociedade de Geografia de Lisboa. 114 pp. 1916. Lisboa: Tip. da Cooperativa Militar.

An essay, embracing the result of the author's study of sleeping sickness as observed in Portuguese West Africa, from 1904 to the present time. Notes in full are furnished of no less than 132 cases, treated in various ways, but with only a modicum of success. The author's general conclusions are as follows:—

1. The maximum dose of atoxyl attainable with man is 15 cc. of a 10 per cent solution, corresponding to 1·5 grammes of the drug. It may be given in hypodermic injections without local inflammation or pain. There is an advantage in repeating the injection every 8 or 10 days.

2. This treatment will clear the peripheral blood of trypanosomes to such an extent that inoculation experiments on animals will be negative. The trypanosomes will, however, persist in the cerebro-spinal fluid, a fact which shows that such treatment is not capable of bringing about a cure, when once the meninges have been invaded. A cure may, however, be hoped for in those cases in which the examination of the cerebro-spinal fluid proves negative.

3. The injection of atoxyl into the cerebro-spinal canal can be done without danger, whatever may be the degree of benefit which will result.

4. It is at any rate an advantage, from the prophylactic point of view, to clear the peripheral blood of a patient from trypanosomes so that he is no longer a focus of infection.

5. None of the substances tried by the author in subarachnoid injections, such as lysol, brilliant green, atoxyl, arsacetin, neo-salvarsan and galyl, will sterilize the cerebro-spinal fluid sufficiently to cure sleeping sickness. J. B. N.

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* In a letter to the Editor dated 25 October, 1916, BASSETT-SMITH writes that infection has been established in two guineapigs. The parasites are scanty and the author states that he considers thick dehaemoglobinised films stained with Eosin azure the best method of examination.

DUKE (H. Lyndhurst). **Trypanosomiasis in Northern Uganda.**—*Jl. of Hyg.* 1916. Sept. Vol. 15. No. 3. pp. 372–387. With a map.

The author refers in considerable detail to the report by Miss ROBERTSON on cattle trypanosomiasis in the Masindi District of Northern Uganda [see this *Bulletin*, Vol. 3, p. 419].

He doubts the correctness of the opinion expressed by Miss ROBERTSON that the trypanosomes responsible for the disease in cattle, and a free-flagellated *brucei* like organism found in a dog, had been imported from outside owing to the moving of large herds of cattle from the south, and had only recently established themselves in the *morsitans* belt near Masindi. His criticisms are based partly upon an exhaustive enquiry amongst the natives and partly upon his own experiments and observations.

Duke writes that, as a general principle, the idea of a large area of very sparsely populated bush country, thick with game and *morsitans*, being free from trypanosomes is to his mind untenable. [This opinion was expressed by the reviewer when summarising Miss ROBERTSON's paper. *loc. cit.*] The view is expressed that the pathogenic trypanosomes of cattle and domestic animals were originally derived from the apparently harmless parasites of wild game.

Miss ROBERTSON's assumption that disease or death in cattle in the area visited is invariably due to trypanosomes is inadmissible, as in reality several other diseases are known to have occurred among these herds; eg., Nsotoka appears originally to have referred to pleuropneumonia and is now used for rinderpest or acute trypanosomiasis; and even Amakebbe, the best known native name for a disease of cattle, is of doubtful significance and Duke has known it applied to rinderpest and undoubted cases of trypanosomiasis. HUTCHINS, the C.V.O. of Uganda, expressed the opinion that some of the accounts of the epidemic, as supplied by various herdsmen, point to Babesia as the causative agent.

Duke points out that Miss ROBERTSON is inclined to assume that once an animal is infected with trypanosomes, it is doomed to a more or less speedy death. Infections with *T. nanum*, *T. vivax* and *T. uniforme* are not necessarily fatal, or at any rate not rapidly fatal, but often extremely chronic. Hence, the conclusion that an animal has been recently infected because the only sign of disease is the occurrence of *T. vivax* or *T. nanum* in the blood is not justifiable.

HUTCHINS confirms Duke's opinion that when the herdsmen refer to *Lwakipumpuru*, they mean genuine trypanosomiasis. It is interesting to note that there have been at least two epidemics of Lwakipumpuru in the Buruli cattle country before the one under discussion—one about 1860 and the other about 1890. Details are furnished of the movement of cattle in the Buruli country where, as a rule, *morsitans* is scanty; the grazing grounds of Buruli are separated from the great tsetse reservoir of Masindi by a belt of short grass plains some 8 to 10 miles broad. But given some particularly favourable year or season in which *morsitans* for some reason or other multiplied and spread, then we have all the requirements for an epidemic in Buruli. It is highly probable that such favourable seasons do occur. In face of such epidemics cattle would be driven northwards across the Kafu and the probability of their encrouching on the great Masindi fly belt would be increased. Again, with an increased number of

cattle on the narrow strip of plain between the river and the fly country, there would be an increased likelihood of "following fly" accompanying traffic along the roads through the fly belt, meeting herds.

The part played by "following fly" in the spread of disease is a very important one, as demonstrated by an experiment by FISKE and the author. In this it was shown that although a slow pedestrian will soon shake off "following fly" the pace of a cyclist seems to exert an irresistible attraction, a large number following for miles. Such agencies doubtless play their part in the spread of trypanosomiasis and Duke holds it possible that the introduction of bicycles among the natives of Busindi, dating from 1908, had a definite influence on the recent epidemic. Various fly experiments in the Masindi *morsitans* belt are recorded.

Wild *G. morsitans* were fed on suitable animals, more especially monkeys. In all 13 experiments, comprising 1857 flies, were performed. A trypanosome which, for convenience, the author refers to as *T. brucei* was obtained on 11 occasions. These observations were made approximately one year after Miss ROBERTSON's visit. *T. pecorum*, *T. nanum*, *T. vivax* and *T. uniforme* were recovered on numerous occasions, double and treble infections in the experimental animals often resulting. During this period two "natural" infections in domestic animals which had been exposed to fly were seen, viz., *T. brucei* in a dog and *T. pecorum* in another dog. The flies used in the above feeding experiments were dissected and examined for trypanosomes. The author notes that infection of proboscis only is ascribable to *T. vivax* or *T. uniforme*; those of proboscis and gut to *T. nanum* or *T. pecorum*; those of the gut and salivary glands to the *brucei* like organism; and those of the gut only, to immature infection with either *T. nanum* and *T. pecorum* or the *brucei* like organism. He compares his result with those obtained by Miss ROBERTSON and concludes that as the "gut not proboscis" infections had not increased *T. brucei* is not of new introduction.

In another series of fly feeding experiments, the results were controlled by dissection of all the flies employed, as they died, either during the experiment or at its conclusion. On every occasion where a positive salivary gland infection was seen, the animal fed upon developed *T. brucei*; *T. nanum* appeared more commonly than *T. pecorum*.

Inoculations were made from the blood of 30 game; 16·6 per cent were shown to be infected with trypanosomes, 6·6 per cent being *T. brucei*. Similar experiments were performed in other tsetse districts of the Northern Province to determine the distribution of the *brucei* like organism.

1. Ngussi River, 3-4 miles from the falls. In this neighbourhood three species of Glossina were obtained, *G. pallidipes*, *G*, *palpalis*, and *G. fusca*. A number (65, 95 and 5 respectively) of each were dissected and gut and salivary gland infections were found in 3 per cent of *G. pallidipes*. *T. brucei* was also obtained in feeding experiments. No game inoculations were made in this district.

2. Region of the Tonya Peninsula and shore of Lake Albert. Here *G. palpalis* only was found; 407 flies were dissected, but no salivary gland infections were observed. Of 20 game examined 9 per cent were found infected with *T. nanum*, but none with *T. brucei*, nor was *T. brucei* obtained in feeding experiments.

3. Chopi, Victoria Nile and Bugungu Region. *G. palpalis* and *G. morsitans* were found and *T. brucei* was obtained once in a feeding experiment with *G. morsitans*. Twenty game were examined and 19 per cent. were found to be infected with trypanosomes, but none were of the *brucei* type.

4. Namasale Peninsula. No tsetse were found here, but ten game were examined with negative results.

5. Northern Buruli. Here again no tsetse were found and 17 game were found to be negative.

Duke compared the various strains of "*T. brucei*" which he recovered during his investigations and concludes that they belong to the same species.

The disease in dogs is acute and is characterised by keratitis in the majority of cases. Oedema of the face is often present in sheep and goats. The average duration of the disease in 8 dogs was 26 days, in 5 monkeys 40 days (one young monkey not included in this, was alive and active nearly four months after infection).

The author states that the above facts show that a trypanosome of the *brucei* type is widely distributed throughout the southern part of the Northern Province, probably indeed wherever *G. morsitans* and *G. pallidipes* are found. Speaking generally, wherever cattle are exposed to the bites of tsetse, especially of *morsitans* and *pallidipes*, they sooner or later sicken and die out. The, at first sight, alarming discovery in the Masindi fly belt of a trypanosome showing close affinity to an organism recently isolated from man in South Africa need not cause any undue alarm. A similar or identical trypanosome will probably be found in every *morsitans* or *pallidipes* area in Africa. As it may, for unknown reasons, develop the faculty of more or less permanent survival in man—a host usually immune—it must be viewed as a potential source of danger to human beings. A number (228) of natives living in the fly belt were examined with negative results.

From the administrative point of view Duke does not regard the trypanosome as a human parasite and provided steps are taken against the introduction of large numbers of persons into the at present sparsely populated fly area, there is no reason to expect any untoward development.

W. Y.

VAN SACEGHEM (R.). **Contribution à l'étude de la transmission du** *Trypanosoma cazalboui.*—*Bull. Soc. Path. Exot.* 1916. Vol. 9. No. 8. pp. 569–573.

Certain trypanosomes are seen, in nature, to be transmitted exclusively by Glossina, in which they undergo a definite developmental cycle; such are *T. brucei-pecaudi*, *congolense-dimorphon* and *rhodesiense*. Others are transmitted in a simpler fashion in that they do not undergo any definite cycle in the intermediate host but are propagated mechanically. Thus *T. evansi* according to DARUTY DE GRANDPRÉ is spread by *Stomoxys nigra* and LEESE obtained further results in the transmission of this parasite by Tabanus, Haematopota and Stomoxys.

A third group of trypanosomes are propagated indifferently by Glossina and other biting insects. Such is *T. cazalboui*, the development of which in Glossina is quite different from that of the first group.

Instead of an " infection totale " of the digestive tract there is merely a direct infection limited to the proboscis. The development of *T. cazalboui* in the proboscis of Glossina is a step on the way to mechanical transmission.

BOUFFARD at Bamako has established clearly the possibility of actual transmission of *T. cazalboui* by Stomoxys.

The author states that at Zambi he has proved definitely that *T. cazalboui* var. *pigritia* is spread by flies other than Glossina. A description of this parasite is given. [It does not appear to differ in any way from *T. cazalboui* except perhaps in the fact that it did not exhibit rapid translatory movements.] In the district of Zambi (Bas Congo) are herds of cattle which find pasturage in places where it is certain that Glossina does not occur, yet infections of *T. cazalboui* are found in these herds. New cases are observed only during the rainy season—November to May.

Van Saceghem observed that the first cases of infection coincided with the appearance of a Haematopota—*H. perturbans* EDWARDS. The pasturage of herds which become infected is in the vicinity of papyrus swamps where *H. perturbans* swarms ; this fly does not exist in those places in which the cattle remain healthy.

H. perturbans, captured in animals infected with *T. cazalboui* var. *pigritia*, exhibit active trypanosomes in the gut. It seems that the trypanosome can become fixed to the mouth parts of the fly and remain alive there for a certain time so that they are able to infect a susceptible animal. In those districts where, in 1912, more than forty per cent. of the animals had trypanosomiasis Glossina did not occur but *H. perturbans* was very common.

A few details are given concerning *H. perturbans*, which is a new species to be described shortly.

The reservoir of the virus in the district concerned is the sick cattle ; certain wild animals must also play a part, although all those examined were negative.

The author concludes :—

1. *T. cazalboui* var. *pigritia* is transmitted in nature by flies other than *Glossina*.

2. The principal agent is, in the Zambi district, *H. perturbans*, Edwards. Probably this is not the only transmitter, Stomoxys, Lyperosia, mosquitoes and even certain ticks, in the author's opinion, also playing a part.

W. Y.

VELU (H) & EYRAUD (R.). **Trypanosomiase des chevaux du Maroc. Infestation d'un jeune chien par l'allaitement.**—*Bull. Soc. Path. Exot.* 1916. Oct. Vol. 9. No. 8. pp. 567–568.

It has been shown by NATTAN-LARRIER that *Schizotrypanum cruzi* passes regularly into the milk of infected females whereas *T. equiperdum* is but rarely found in the mammary secretion ; furthermore LANFRANCHI has demonstrated that animals infected with *T. brucei* or *T. gambiense* can infect their young by suckling.

Whilst working with the trypanosome of horses from Morocco the authors noted a similar fact, a dog infected with this virus transmitting the parasite to one of its litter.

Details of the observation are given. W. Y.

MARCANDIER (André) **La résistance globulaire dans quelques cas de paludisme, de fièvre bilieuse hémoglobinurique et de maladie du sommeil.**—*Bull. Soc. Path. Exot.* 1916. Oct. Vol. 9. No. 8. pp. 647–665.

The first portion of this paper, in which the technique employed and the red cell resistance in cases of malaria and blackwater fever are described, is not dealt with here. The second portion deals with the resistance of the red blood cells of cases of trypanosomiasis to sodium chloride solutions of decreasing concentrations.

The author found that in 14 cases in the second stage of sleeping sickness the resistance of the washed red corpuscles to hypotonic salt solutions was increased in one case, very slightly diminished in two cases and normal in eleven instances. He concludes therefore that the sleeping sickness even when the trypanosomes are in the peripheral blood does not appear to exert any definite influence on the red cell resistance.

W. Y.

NOVAES (Eucario). **La trypanosomiase brésilienne et son rapport avec le corps thyroide. Travail fait à l'Institut pathologique de l'Université de Genève.**—*Rev. Méd. de la Suisse Romande.* 1916. Sept. 20. Vol. 36. No. 7. pp. 592–614. With 2 plates.

The author writes that he has studied this disease because, firstly, it is an interesting infection due to a special parasite, the importance of which is demonstrated more clearly each year, and secondly, because there occurs in it a pathological modification of the thyroid gland of such a kind that he has sought to establish a parallel between endemic goitre and the Brazilian disease, both of which occur in mountainous countries.

A summary of the literature—more especially of the Portuguese—is given together with personal observations made upon the organs of infected monkeys, mice and dogs.

The earlier portion of the paper concerns itself with the development and morphology of *Schizotrypanum cruzi* in *Conorhinus megistus*; this is followed by an account of the development of the parasite in the vertebrate host. Novaes agrees with BRUMPT, ROCHA and MAYER that the trypanosome in the blood stream is always free in the plasma and that an intracorpuscular stage in the red cells does not occur. Polymorphism of the parasite in the blood, indicating different stages ending in the adult form, was observed. The youngest forms have an elongated blepharoplast situated at the posterior extremity, the nucleus is narrow and the whole parasite is elongated and narrow. Intermediate stages between this and the fully formed adult trypanosomes were also seen. In support of the view that these elongated, narrow parasites are really young forms, which reach the blood after multiplication in the tissues, is the fact that they predominate during the first days of infection and are subsequently replaced by the broader forms with the characteristic blepharoplast representing the adult trypanosomes. Some of the young forms do not show any differentiation of the undulating membrane and flagellum. That very rarely Leishmania forms are found in the circulation is explained by the fact that certain tissues, especially the cardiac muscle, which is

more fragile than others on account of the absence of a sarcolemma, are liable to disintegrate prematurely and allow the escape of the still undeveloped parasites into the tissue spaces and consequently into the circulation.

The author made a careful study of the morbid anatomy of the disease. He examined the skeletal muscle, unstriated muscle, cardiac muscle, adipose tissue, subcutaneous cellular tissue, central nervous system, lymphatic system, bone marrow, thyroid gland,suprarenals, lungs, liver and spleen of animals infected with the trypanosome. From this study he concludes that most of the cells of the organism tolerate invasion by the parasites fairly well, without undergoing any appreciable modification. The degenerative phenomena and frequently even the functional disturbances which are observed do not appear to be in direct relationship to the presence of colonies of the parasite. If, however, modification of the tissues does occur it must be attributed to mechanical and chemical causes. Atrophy of histological elements due to compression exercised by large colonies of the parasite has been observed and also a proliferation of the tissues due to their action. Wholesale degeneration of parasites produces a destruction of their cellular hosts which on its dissolution promotes inflammatory changes in the vicinity.

Endotoxins set free on the death and absorption of the trypanosomes account for the fact that certain cells enclosing only a small number of the parasites are altered, whilst others containing large numbers present a normal appearance. It is to the setting free of toxins and their dissemination by the lymphatic circulation that the more or less extensive inflammatory lesions, which are not in the immediate region of parasite colonies, are probably due. There is, nevertheless, an evident relationship between the number of foci of parasites destroyed and these inflammatory phenomena.

Certain organs, such as the thyroid gland, which do not harbour the parasites exhibit morbid changes. One must not, therefore, regard the presence of parasites and the pathological modifications as equivalent, nor explain clinical phenomena solely on the assumption of the presence of the trypanosomes.

The author draws attention to a certain morphological modification of the Leishmania stages of the parasite which depend upon the kind of tissue invaded. Thus, the longitudinal striations of skeletal muscle render the parasites narrower and smaller, whilst in a diffuse tissue, such as fat, they are larger and rounder because their development is more freely effected.

The paper closes with some remarks on the clinical symptoms of the disease.

Three coloured plates illustrate the author's points. W. Y.

Kofoid (Charles Atwood) & McCulloch (Irene). **On *Trypanosoma triatomae*, a New Flagellate from a Hemipteran Bug from the Nests of the Wood Rat *Neotoma fuscipes*.—*Univ. California Publicat. Zool.* 1916. Feb. 18. Vol. 16. No. 10. pp. 113–126. With 2 plates.**

Prospectors in the desert regions of California and Arizona have reported from time to time that they have been attacked at night by biting insects, whose bite produced local inflammation and general

malaise, but had no permanent ill effects. Some of the insects sent to the authors were found to be *Triatoma protracta*. These hemiptera are found in the nests of the wood rat, *Neotoma fuscipes*.

Dissection of some of the insects proved that they contained a flagellate, whose life-cycle, so far as it is known, has a resemblance to that of *Trypanosoma lewisi* in the rat flea, as described by MINCHIN and THOMSON. The authors use the same terminology as the last mentioned workers, except that they replace the term "kinetonucleus" by that of parabasal body. The full outline of the life-history could not be obtained, but the stages found resembled those of *T. lewisi*.

The trypanosome phase was found in a single bug that had recently fed. Its stomach contained half digested blood swarming with trypanosomes. The body of the flagellate was 20μ to 39μ in length and $0{\cdot}6\mu$ to $1{\cdot}6\mu$ in diameter. There is a short flagellum, which is "less than $0{\cdot}2\mu$ of the body in length." The flagellum passes along the membrane and reaches the parabasal body, with which it appears to merge in most cases. A parabasal rhizoplast may be present. The parabasal body varies in size and shape. This is considered to support the view of KOFOID that the "kinetonucleus" is in reality the parabasal body or kinetic reservoir, fluctuating in the volume of its substance with the changing internal conditions and motor activities." Intracellular stages of the trypanosome have, so far, not been seen. Some stomach phases, however, have been interpreted as merozoites or stomach phases resulting from multiple fission. They are shorter and more rigid in body than the trypanosome forms. The parabasal body is at the extreme posterior tip of the body.

Large crithidial forms occur in the stomach of the bug. Forms transitional between them and trypanosomes have been found. The parabasal body is anterior to the nucleus, the nucleus is rounded and vesicular, as opposed to the elongate, slender, asymmetrical form in the trypanosome. The parabasal also is barlike and is transversely situated. The authors justly remark that their conclusion as to the identity of the crithidial flagellate with the trypanosome "rests merely on similarities to the cycle of *Trypanosoma lewisi*, and not as yet upon experimented feeding and infection. While this hypothesis of identity is a reasonable one and proof of it by experiment is to be expected, the *possibility* remains of the occurrence here of two specifically distinct organisms." The crithidial forms are from 8μ to 40μ long, with a diameter of $1{\cdot}8\mu$ to $2{\cdot}5\mu$, rarely as much as 4μ. The body is less sinuous than the trypanosome and the movements more darting in character. The nucleus is spherical with a chromatin-encrusted membrane. The flagellum terminates in a small granule immediately above the level of the bilobed transversely located parabasal. Two types occur. One is large, suggestive of intracellular multiple fission in the epithelial cells, but it has never been found in the intracellular condition. The second form shows a series of forms of decreasing size and increasing stoutness. Some slender flagellates have also been observed.

Small trypaniform flagellates have been found in great abundance in the rectum of the bug, where they were in active movement. They were somewhat smaller than the merozoites in the stomach.

A comparison is made of this parasite with the stages of *Schizotrypanum cruzi* in *Conorhinus megistus*. The trypanosome and crithidial stages are much alike, but there is more divergence in the rectal trypaniform stages. No forms of the trypanosome have been found in the body cavity or in the salivary glands of *Triatoma protractus*. It is stated that "a re-examination of Schizotrypanum is desirable, especially since the distinctions between this genus and Trypanosoma are less obvious now than formerly."

A. P.

i. WATERSTON (James). **Notes on African Chalcidoidea—V.**—*Bull. Entom. Res.* 1916. Oct. Vol. 7. Pt. 2. pp. 123–132. With 5 text figs.

ii. TURNER (R. E.) & WATERSTON (James). **A New Parasite bred from** *Glossina morsitans* **in Nyasaland.**—*Ibid.* pp. 133–135. With 2 text figs.

i. The male of *Eupelminus tarsatus* Waterst. is here described for the first time and the female more fully. LAMBORN considered it to be a hyper-parasite of *G. morsitans* [see this *Bulletin*, Vol. 8. p. 266], but the author "cannot agree that the parasitic status of *E. tarsatus* is definitely fixed by our present knowledge of its habits."

ii. The new parasite was bred from a pupa obtained at Monkey Bay. It is described with figures, belongs to the family *Bethylidae*, and is named *Prolaelius glossinae*, sp. nov.

A. G. B.

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

HAGLER (Frederic). **Relapsing Fever.**—*Milit. Surgeon.* 1916. July. Vol. 39. No. 1. pp. 36–43. With 2 plates.

The author, who was attached to the American Red Cross Hospital Unit, Belgrade, Serbia, draws attention to the lack of publicity afforded the epidemic of relapsing fever in Serbia, much attention having been devoted to the epidemic of typhus concurrent with it. He points out the confusion of typhus fever, typhoid and relapsing fever under the term typhus, and uses the term relapsing fever to differentiate the spirochaetosis he describes.

A brief account of the morphology of *Spirochaeta recurrentis* is given, the author noting that the morphology of the parasite in one patient may be different from that presented by the next patient. [Doubtless the differences are explicable by reference to the processes of growth and division.] The mild cases presented fewer, shorter, thinner and more fragile spirochaetes than the more severe cases.

For staining purposes, Giemsa staining was considered too slow and the following method was devised :—

"Collargol, 1 gram, in distilled water, 2 grams, is allowed to stand for at least twenty-four hours, although a slightly longer period is preferable. The resultant solution is filtered several (three to four) times through ordinary heavy filter paper. The stain is then ready for use and in glass-stoppered containers keeps indefinitely. When used, a large loopful is placed on a clean slide, a small loopful of blood freshly drawn with usual precautions is stirred into the drop of collargol solution on the slide, and a film made by drawing rapidly out with a second slide."

A drop of blood about one-third the size of the drop of collargol is recommended. The blood cells appear as unstained or mottled discs, while the spirochaetes stand out as uncoloured spiral figures on the mahogany background. The method is simple, rapid and permanent. If malarial parasites are present, however, they are not stained.

With regard to transmission, the louse was inculpated. "Relapsing fever appeared with typhus fever (which is admittedly transmitted by the louse), and measures instituted against lice soon markedly decreased the incidence of both. *This difference is noted, however, that whereas typhus practically disappeared with lice, relapsing fever persisted and continued to develop in the medical wards of our Belgrade hospital until systematic sulphuric fumigation of wards and rooms was undertaken to destroy bed-bugs.* After this it also disappeared. Thus, it would seem that the bed-bug certainly is one and probably the most important of the agencies of transmission."

The incubation period was probably not more than ten days, and was seldom more than seven or eight. An account of the symptoms is given. They continued unrelieved "until about the eighth or ninth day, when a peculiar break was noted in the train." A decided drop in temperature occurred—"a pseudo-crisis—of two or more degrees, succeeded by a rise to a higher point than any before attained and accompanied by a distinct aggravation of all the symptoms." It was followed in a few hours by a genuine crisis. A fall of temperature, as much as 8 degrees in two hours, marked the end of the paroxysm. As many as five relapses occurred. The afebrile periods were of the same duration in one patient, but in different persons varied from

7 to 10 days. The prognosis was good. "Quinine alone seemed to have no effect on the disease, but when with full doses of Fowler's solution, a fairly constant effect was noted. "The former in 10 gr. doses, three times daily, and the latter in 7 m., and increasing doses, shortened noticeably the length of the febrile periods and reduced the number of relapses." Salvarsan was not available.

The illustrations show the appearance of a blood film stained by the collargol method, and the temperature chart of patient given symptomatic treatment, and another under treatment with quinine and Fowler's solution.

A. Porter.

i. Babes (V.). **Hémorragies méningées et autres manifestations hémorragiques dans la fièvre récurrente.**—*C. R. Soc. Biol.* 1916. Oct 21. Vol. 79. No. 16. pp. 855–857.

ii. Gane (T.) & Buïa (I.). **Sur les phénomenes méningitiques pendant la fièvre récurrente chez les enfants.**—*Ibid.* pp. 864–865.

i. The first paper gives an account of certain features of the epidemic of relatively benign relapsing fever that was observed by the author during the outbreak in Bucarest in 1915. The greater number of the patients responded rapidly to an injection of salvarsan. The epidemic was spread among the poorer classes, it is stated, by louse bites, but other means of infection occurred. Deaths were rare. One fatal case, however, showed an eruption of tiny haemorrhagic spots on the thorax and limbs. At autopsy, tumefaction of the spleen, atrophic cirrhosis of the liver and abundant haemorrhage of unknown origin into the stomach and intestines were found. The gall bladder and spleen contained a bacillus of the Coli group, which caused small necroses in the spleen.

Haemorrhages were frequently seen during the epidemic. In about half the cases, there was an eruption of hyperaemic spots on the abdomen and limbs, often disappearing after the paroxysm. The localisation of the malady in the meninges is more important. Meningeal symptoms, manifested in opisthotomos, cephalalgia and Kernig's sign were seen, more especially in children.

A full account of the autopsy on a 50 year old man is given. He had suffered from relapsing fever for several days with headache and stiff neck. In hospital improvement occurred, but a relapse ensued on the next day. His blood contained numerous spirochaetes. He died in coma on the third day in hospital. At autopsy, the pupils were contracted, and the skin yellowish with little purple spots on the limbs. The meninges were thick, and made oedematous by a brownish yellow to deep red liquid. Confluent ecchymoses occurred around the meningeal vessels, especially the capillaries, so that the meninges were converted into a thick red tissue. The cerebral mass was anaemic, and the ventricles contained red fluid, but no spirochaetes were found in it. The pharynx, larynx and left lung were hyperaemic and the right lung oedematous and adherent. The heart was hypertrophied and fat. The spleen was greatly hypertrophied and the pancreas enlarged. The liver was tumified and fatty. Microscopically, spirochaetes were found in the blood of most of the organs. The small vessels of the meninges contained large numbers of them. The skin lesions were less pronounced than in typhus.

It is considered that the meningeal form of relapsing fever is established. The type of fever and the presence of spirochaetes differentiate it from typhus, while the presence of a rash in relapsing fever must be remembered to avoid confusion with the more fatal disease.

ii. The second paper deals with the authors' experience of four cases of relapsing fever showing a clear meningeal syndrome without leucocytic reaction in the cerebro-spinal fluid. Two cases were in brothers aged 6 and 10, one was a man of 30, and the fourth a boy of 12. The clinical history of the last case is given. The clinical appearance was that of typical meningitis. Numerous spirochaetes, however, occurred in the blood. The meningeal condition lasted four days, the temperature oscillating about 39° C. On the 5th day it fell sharply and the meningeal syndrome disappeared. After seven days, a second attack occurred and lasted five days, with meningeal symptoms. The cerebro-spinal fluid showed nothing abnormal on examination. After this attack, the child recovered completely. The other cases presented much the same features.

The authors do not think that their cases are like those described by Babes, but consider that they should rather be placed in the pseudo-meningitis [*meningisme*] group.

A. P.

Robert (A. Eug.) & Sauton (B.). **Action du bismuth sur la spirillose des poules.**—*Ann. Inst. Pasteur.* 1916. June. Vol. 30. No. 6. pp. 261–271.

The authors made use of bismuthotartrate of sodium, prepared according to Cowley's method. All the solutions used contained exactly 1 per 100 parts of bismuth. A healthy fowl can tolerate 30 to 35 mgm. of bismuth per kilogram of weight; one infected with spirochaetosis only 15 to 20 mgm. per kilo. The action of the drug on the spirochaetes in vitro was poor, but it was efficacious on infected birds. The drug was given 24 to 30 hours after infection, when the spirochaetes had appeared in the blood, 0·2 cc. or 0·5 cc. being the dose.

The intravenous injection of 20, 25, or 30 mgm. of bismuth per kilo. of bird 48 hours before inoculation with infected blood retarded the appearance of the spirochaetes by a day. Intra-muscular injection of 50 to 70 mgm. as a preventive was quite efficacious, no spirochaetes appearing. If the injection were made four hours after infection, it retards and attenuates the malady. For curative purposes, early treatment is best. Two successive intravenous inoculations of 10 mgm. per kilo. weight of host given 30 and 48 hours after the appearance of the spirochaetes gave the best results.

A. P.

Urbain (Gaston). **Méningo-encéphalo-myélite des poules (? spirillose).**—*Bull. Soc. Path. Exot.* 1916. Oct. Vol. 9. No. 8. pp. 561–563.

The author, working in the state of Parana, Brazil, has observed a condition in fowls that he terms meningo-encephalo-myelitis. Adult fowls only were affected. The disease was not contagious. It lasted from 15 to 30 days. The infected bird was sleepy, remained in one place and refused food. On the 3rd or 4th day conjunctivitis appeared

and then keratitis of one eye. The bird was irritable if forced to move, and turned in circles, lesions of the nervous centres or of the labyrinth being thus indicated. Later the second eye became blind. Symptoms of meningitis appeared; the neck muscles contracted more and more, the wings and feet became paralysed, and epileptiform attacks occurred a day or two before death.

The blood of an infected bird coagulated with difficulty. There were slight signs of enteritis. The cloaca was dilated and paralysed. The liver, spleen, kidneys and apex of the heart showed signs of degeneration. Inflammation of the meninges, haemorrhages in the olfactory lobes, cerebral hemispheres, optic lobes, hypophysis, optic nerves, medulla and spinal cord occurred. The labyrinth was normal. The blood showed a marked eosinophilia. The secretions of the conjunctiva, anterior chamber of the eye and of the throat, the intestinal contents and nerve substance showed a micro-organism resembling a spirillum, which stained blue with Giemsa and showed two or three red granules, the whole resembling what is seen in diphtheria. Pure cultures of the organism were found in the eye and brain. Animal experiments so far have been negative and, owing to lack of media, it was impossible to make cultures.

[As meningeal symptoms have been observed in relapsing fever, this work is summarised, though there is no proof that the malady was due to a spirochaete.] A. P.

BENIANS (T. H. C.). **Relief Staining for Bacteria and Spirochaetes.** —*Brit. Med. Jl.* 1916. Nov. 25. p. 722.

The paper refers chiefly to the relief staining of bacteria. The microörganisms themselves are not stained, but they are left colourless in a coloured and less transparent background.

"A small drop of a 2 per cent. aqueous solution of Congo red is placed on a slide, and a very small quantity of the bacterial culture, or of the exudate to be examined, is rubbed into it with the platinum wire; the drop is then spread out into a tolerably thick film either with the wire or by means of another glass slide. The film, an opaque blood red, is allowed to dry; the slide is then washed over with a 1 per cent. solution of H Cl in absolute alcohol and dried in the air, or with blotting paper, although the latter is apt to tear the film. The film is then ready for examination with the oil immersion lens."

Broth and salt emulsions need centrifuging before use. In blood so treated, osmotic changes in the red cells may occur. "Spirochaetes as a rule show up fairly sharply, though they have not the brilliancy that the dark background condenser gives them, and of course one has not here the opportunity of observing them in motion." It should be remembered that an organism seen through an opaque film usually seems larger than it appears in a stained preparation. A. P.

SANGIORGI (Giuseppe). **Sugli spironemi della bocca.** [Spirochaetes of the Mouth.]—*Pathologica.* 1916. Sept. 15. Vol. 8. No. 188. pp. 283–285. With 8 text-figs.

The author first gives a general account of the spirochaetes of the mouth, including a sketch of the results of PROWAZEK and HARTMANN and MUHLENS. The latter workers differentiated three types of mouth spirochaetes, large, small and intermediate.

The present author divides the mouth spirochaetes into two groups, the first being forms with refractile bodies and large curves, the second those with less refringent bodies and small curves. Each group is subdivided into three, small, intermediate and large forms. The first group has large elements 9·6μ to 16μ by 0·8μ, with six to eight curves; intermediate forms 6·4μ to 8μ by 0·8μ, with three to four curves; small forms 3·2μ to 4μ by 0·8μ with two or three curves. The second group contains large elements, 8μ to 10μ by 0·4μ to 0·5μ, with four to six curves; intermediate forms 4·8μ to 8μ by 0·4μ to 0·5μ, with three to four curves; and small forms measuring 2·4μ to 3·2μ by 0·4μ to 0·5μ, with one or two curves.

A very brief discussion as to the possible homologies of the above forms with those described by the earlier workers on *S. buccalis* and *S. dentium*, and with the Treponemata described by Noguchi is given, the results being not very clear.

[The whole suggested classification is very artificial. It has been shown for some time that the number of coils of a spirochaete is an indication of its rate of motion and is not a specific character. It would seem that the author has not regarded sufficiently the great morphological variation of the spirochaetes.]

A. P.

Spirochaetosis Icterohaemorrhagica.

Gwyn (N. B.) & Ower (J. J.). **Infective Jaundice (Spirochaetosis Ictero-haemorrhagica). A Preliminary Report.**—*Lancet.* 1916. Sept. 16. pp. 518–519. With 4 text-figs.

The authors, who are members of the Canadian Army Medical Corps, give a preliminary report on certain features of Weil's disease, as observed by them. The clinical course is outlined. There may be an abrupt onset with chill, or a more gradual one with headache, dizziness, nausea, persistent vomiting, diarrhoea and abdominal pains. A few hours later, fever with thirst and aching of the muscles occurs. Jaundice is noticed in 48 to 72 hours. Haemorrhages into the conjunctivae and skin may occur. Bleeding from the nose, mouth, stomach and bowels has been known. There is a decided albuminuria, with numerous casts and red blood corpuscles. In severe cases the prostration is practically a collapse. After three to four days, in mild cases, the fever gradually drops, the vomiting and abdominal and muscular pains subside, while the jaundice fades. Slight or severe febrile relapses are seen or a mild fever may continue for 12 to 20 days. The pulse is slow in relation to temperature and symptoms.

"Jaundice of greater or less degree, with injection of the conjunctivae, herpes, dry tongue, sordes, and late appearing papular rashes in a severely prostrated patient make the general picture of the disease."

A leucocytosis with 80 per cent. polymorphonuclears is present. The faeces are usually bloodstained, and show occult blood reaction at times, but contain no parasites.

In one case only were spirochaetes obtained from cultures of the blood or the blood itself of a patient. Spirochaete-like organisms were then found in the sediment of serum from a blood clot. Drawings of the structures observed are given. Similar bodies were seen in a deep

agar anaerobic culture of blood on the fifth day. Animal inoculations so far have all failed, but the cases only came under observation late in the disease. The authors are aware that their results do not fulfil all the "requirements necessary to prove a causal organism in an infectious disease," but publish in the hope of encouraging others.

A. P.

STOKES (Adrian) & RYLE (John A.) **A Note on Weil's Disease (Spirochaetosis icterohaemorrhagica) as it has occurred in the Army in Flanders.**—*Brit. Med. Jl.* 1916. Sept. 23. pp. 413–417. With 13 charts & 3 text-figs.

The paper opens with an account of the work of Dr. IKADA and his colleagues on the malady known as Weil's disease [see this *Bulletin*, Vol. 8, p. 51]. They also give an outline of the results of the Japanese workers on the etiology and probable mode of spread of the malady, their own experience leading them to favour infection by way of the skin.

Fifteen cases of Weil's disease were observed in Flanders, and three deaths occurred. The earliest cases were seen on the fifth and sixth days. The latest admitted was on the tenth day of illness. With one exception, all the men had been recently, or were at the time, employed in the trenches. All knew when they were first affected, a tribute to the acuteness of the onset of the malady. One only knew when the characteristic jaundice appeared, and he dated it on the fourth day.

The symptoms are described in detail. As they are much like those described by GWYN and OWER [see above], they need not be repeated. The sets of observations corroborate one another. The prognosis varies. Mild and severe forms of the disease were seen. In some cases the malady was of short duration; in others, the men were very ill and three of them died. Ten cases are described in detail. Guinea-pigs were inoculated with blood from ten patients and two of them showed spirochaetes later. A table showing the day of the disease on which the blood was taken, the quantity inoculated, and the result is given. Two of the four experiments done on the sixth day of illness were positive and no positive results were obtained after the tenth day. The infected guinea-pigs became ill on the 5th and 6th days. Their temperature rose to over 104° F. in each case. The post-mortem results of both men and animals corresponded with those obtained by the Japanese workers.

The spirochaetes found in the liver smears of the guinea-pigs varied in length, longer forms being the more common. Under dark-ground illumination they "seemed to be composed of closely packed refractible particles." Three sketches, not drawn to scale, but representing the shapes and forms of the spirochaetes observed are given. So far, no spirochaetes have been seen in the urine of the patients. Experiments on infecting guinea-pigs with urine are not yet complete. Cultures were not made.

From their results the authors believe that epidemic jaundice (spirochaetosis icterohaemorrhagica) in Japan and in Flanders is identical.

A. P.

MARTIN (Louis) & PETTIT (Auguste). **Présentation de préparations microscopiques et de pièces anatomopathologiques, relatives à la spirochétose icterohémorragique.**—*C. R. Soc. Biol.* 1916. July 22. Vol. 79. No. 14. p. 657.

The authors, having received from Dr. STOKES two guinea-pigs inoculated with the virus of infectious jaundice, which he had isolated from European soldiers on the French Front, showed specimens of the spirochaete found therein. The spirochaete was very polymorphic, and presented the characters of *Spirochaeta icterohaemorrhagiae* as described by the Japanese discoverers, whose work is quoted by the authors. They also recall that for field purposes, animals should be inoculated with several cc. of blood or urine taken during the first seven days of illness. In positive cases, the experimental animal usually dies in about fourteen days, and presents obvious jaundice and extensive haemorrhages.

A. P.

i. GARNIER (Marcel). **La transmission au cobaye de l'ictère infectieux primitif.**—*C. R. Soc. Biol.* 1916. Nov. 4. Vol. 79. No. 17. p.p. 928–930.

ii. MARTIN (Louis) & PETTIT (Auguste). **Réaction hématophagique dans les ganglions lymphatiques du cobaye, au cours de la spirochétose ictéro-hémorrhagique.**—*Ibid.* pp. 946–947.

iii. RENAUX (Ernest). **Note sur la Spirochétose ictéro-hémorrhagique.** —*Ibid.* pp. 947–949.

i. The author inoculated 28 guinea-pigs with urine or blood of patients suffering from infectious jaundice, 16 with blood and 12 with urine. Two of the experiments had to be discarded. Of the remaining 26, four of the inoculated guinea-pigs died, the transmission having been effected in three with blood and in one with urine. Of the animals which succumbed two were inoculated with blood taken from the patient on the day of the appearance of the jaundice. One of three animals inoculated with blood taken on the second day of icterus died. The positive result obtained by inoculating urine was with that taken from the patient on the 13th day of jaundice. Jaundice appeared in the inoculated animals from the 9th to the 12th day after injection. The spirochaete was found in smears from the liver and kidneys.

ii. This paper records the presence of hyperplasia of the lymphatics of a guinea-pig infected with ictero-haemorrhagic spirochaetosis. Small haemorrhagic layers surround the ganglia, and the lymphoid tissue shows a more or less reddish tint. The subcortical and interfollicular sinuses are engorged. An undue proportion of leucocytes showing amphophile granulations is present. The characteristic of the ganglionic reaction in this form of spirochaetosis is the haematophagic phenomenon.

iii. The author gives a general account of the various appearances met with in cases of icterohaemorrhagic spirochaetosis observed on the Western Front in a Belgian hospital. The liver and the kidneys appear to be most affected. Albuminuria and urobilinuria are found during the 8th and 9th weeks.

In some cases the hepatic symptoms predominate, in others the renal ones are the more obvious. Renal symptoms are considered to have a bad significance in prognosis, the only two deaths observed by the author having been in renal cases.

For the detection of the spirochaetes, the urine was submitted to centrifuging for 30 minutes at 4,000 revolutions. On the tenth day of illness the spirochaetes were found in small numbers, the greatest number being obtained on the 15th day. Very small numbers have been found in patients' urine even after seven weeks. *Spirochaeta icterohaemorrhagiae* could not be identified in faeces, owing to the presence of intestinal spirochaetes. Anaemia was often noted in the cases. Extensive haemorrhages were unusual. In the first week of illness there was a leucocytosis, and from the 3rd to 4th week a leucocpenia was observed.

A. P.

MISCELLANEOUS.

VIALATTE (Ch.). **Rapport sur le fonctionnement du laboratoire de microscopie de Beni-Abbès (Sahara-Oranais) en 1915. (Paludisme, Fièvre récurrente, Trypanosomiase, Microfilariose, Myiase, etc.)**—*Bull. Soc. Path. Exot.* 1916. July. Vol. 9. No. 7. pp. 469–486. With a map.

The laboratory at Beni-Abbès came into existence in 1914 [see this *Bulletin*, Vol. 6, pp. 341–2]. It is pointed out that the laboratory has only a modest outfit, and that research work has been done on medical tours or at the daily clinics.

1. Epidemiology of Malaria in the Wady Saoura and especially at Beni-Abbès—The Wady Saoura is formed at Igli by the junction of two other wadys at about 30° N. and 2° W.; it runs south-east for about 250 kilos and then is lost. Water does not flow in it except in the rainy season, but pools, generally salt, are found in it at all times. Its bed is occupied by shrubby vegetation. The climate is that of the desert: the air is dry, rain is rare, and the variations of temperature within 24 hours are great. The inhabitants, about 7,000, are Arabs, negroes from the Sudan, negroids and berbers; they are miserably poor. Water is scarce and is raised by means of primitive wells; most are constantly in use, but others, which have become disused, serve as mosquito breeding grounds till they become choked with sand. The permanent pools above mentioned serve the mosquitoes. It is noted that the winter, spring, and summer of 1915 were very dry and the collections of water were reduced to a minimum.

Of 41 children examined at Igli (May, pre-epidemic period) three had large spleens; none showed parasites. Of 100 sick children in several villages, visited in November, 28 showed parasites: 18 *P. falciparum*, 3 and 7 *P. malariae* and *vivax*. Crescents were often numerous in the former. Half moon bodies and "corps en pessaire" were frequently found. For prevention quinine is distributed freely and is appreciated. Details are given with regard to the administrative and military centre, Beni-Abbès. Here benign tertian is the most common of the forms of malaria.

Relapsing Fever—Five cases were diagnosed in the year, or 14 in twenty months. Three came from Igli where there was a small epidemic. It is not known how the other cases were contracted. In each case there was a single relapse. A sign always noted was the drunken gait (*démarche ébrieuse*) of the patient.

Debab—There was little trypanosome infection in 1915, due to the dryness of the season. Tabanids were few. Of 31 camels examined only one was infected when in 1914 the rate was 17.9 per cent.; 34 horses were free.

The remaining sections deal with filarial embryos found in the blood of eight horses, myiasis in camels, haemogregarines of reptiles, acarian parasites of a fly, and papular eruptions caused in summer by the bites of a species of Phlebotomus [see this *Bulletin*, Vol. 1, p. 239].

A. G. B.

PARKER (E. G.). **Sanitation of American Samoa.**—*U.S. Nav. Med. Bull.* 1916. July. Vol. 10. No. 3. pp. 563–567.

The rat problem in American Samoa is difficult because these rodents are innumerable, their habits are arboreal and there is abundant native food for them. The Government now offers 2½ cents apiece and in Mauna 19,834 rats were caught, by native methods, in December, 1915. Their destruction is important in view of the recent famine. The protection of owls has also been urged. Throughout the world the standard of one rat to one person is generally accepted; this estimate is quite inadequate in Samoa; 30 rats to one human being is regarded as more accurate. There was an epidemic of whooping cough in 1915, imported from Upolu. It was thought that the attacks were less severe and of shorter duration than in the U.S.A. Several deaths occurred amongst infants.

An account is given of the havoc wrought by the hurricane of January, 1915, and the measures taken to avert famine and pestilence. [For an account of the diseases of American Samoa see this *Bulletin*, Vol. 6, p. 352.]

A. G. B.

ROSENAU (Milton J.). **The Prevention of Tropical Diseases.**—*New Orleans Med. & Surg. Jl.* 1916. July. Vol. 69. No. 1. pp. 33–42.

In this interesting address, read at the 13th annual meeting of the American Society of Tropical Medicine, the author of necessity begins by discussing what diseases are to be regarded as tropical. As diseases not regarded as tropical he instances tuberculosis, pneumonia and typhoid which "ply unusual havoc in warm countries." Of the former he writes:—

"Tuberculosis is exceedingly prevalent in tropical countries, due, no doubt, to close contact between children and adults under unhygienic surroundings, aided by the enervating influence of heat and the sapping of resistance by faulty diet. When I was in Santiago de Cuba, I made a study of the vital statistics of that unhappy city, and discovered that for a period of years before the Spanish-American War there were many more deaths among the native population from tuberculosis than from yellow fever, although Santiago had been an endemic focus of yellow fever for many years. Despite this situation, much attention was given to yellow fever and none at all to tuberculosis."

Pneumonia may prevail with great intensity in the tropics, as in the Canal Zone, and on the Rand. "The inhabitants of Vera Cruz dread going to the City of Mexico for fear of contracting pneumonia." Up to the time of the Spanish-American war, typhoid was believed to be absent from the American tropics; it is now known to be very prevalent.

The address leads up to the point that the prevention of tropical diseases rests primarily upon scientific research.

A. G. B.

BLANCHARD (R.). **Quelques cas de pseudo-parasitisme et de xéno-parasitisme.**—*Bull. Soc. Path. Exot.* 1916. July. Vol. 9. No. 7. pp. 522–541. With 2 figs.

According to Professor Blanchard, a pseudo-parasite is harmful and aggressive by itself; it may be only a simple saprophyte or a simple

saprozoite (by which he means animals living in the body at the expense of decomposing matters), but it may also become pathogenic. A xeno-parasite is inert and not pathogenic unless it acts secondarily, by traumatism, by intoxication or by the microbes which accompany it. But he admits that these definitions are not wholly satisfactory.

He proceeds to discuss in a very interesting manner cases of slugs and myriapods in the alimentary canal, anguillulae in the urine, and cases of pseudo-Strongylus and pseudo-hydatid-cyst in the lungs, some of which he himself has met with and others from the literature. For the details the paper must be consulted.

Blanchard explains the cases in which living slugs have been passed by the anus or have been vomited (SHIPLEY, Gordon HEWITT) by the fact that when these creatures are irritated they secrete a large quantity of mucus which serves them as a protection; in one instance the slug is supposed to have been eaten with lettuce a fortnight before.

He refers to a case of LAVERAN and ROUBAUD in which a myriapod was discharged from the nasal fossa, and mentions two cases which he previously reported and two recent ones. In each of these a living *Geophilus carpophagus* was passed per rectum.

A puzzling case of vinegar eels in the urine was only explained when it was found that the eels bred in a small cup into which the tip of a pipette fitted when it was put in its box, but an authentic case of these creatures living in the bladder has been recorded [STILES and FRANKLAND].

Blanchard was the means of correcting the diagnosis in the case of a man with leucin in the urine, the spherules of which had been taken for the eggs of a giant Strongylus; the patient was thus spared nephrectomy. He failed however to secure a revision in a case of DIEULAFOY'S, diagnosed as a hydatic cyst of the lung cured by the patient's coughing it up. The physicians had detected hooks in the membrane, but the parasitologist showed that it consisted of vegetable matter with hairs and a section of it corresponded exactly with that of a piece of peach skin (both are figured). The skin had clung to the man's tonsils and caused an obstinate cough, which ceased when he brought the skin up. This case was published as one of hydatid cyst of the lung in DIEULAFOY'S "Manuel de Pathologie interne" (1895).

A. G. B.

LOVELACE (Carl). **Food in Health and Disease: Some Recent Advances in our Knowledge.**—*Texas State Jl. Med.* 1916. Aug. Vol. 12. No. 4. pp. 180–182.

A forcibly written paper which one would like to see reproduced in an English medical journal. The author regards the question of the aetiology of beriberi as closed three years ago by FRASER and STANTON. Attention is drawn to the frequent mis-statement of the nature and cause of the disease which "has been proved over and over again to bear no more relation to rice than it bears to wheat, or barley, or corn, or the sugars, or to foods of all kinds which have been denatured by sterilisation at a high temperature . . . To refer to it as a disease associated with a rice diet . . . is to shut one's eyes deliberately to what is perhaps the greatest fundamental advance . . . that medicine has made since

the days of Pasteur and Lister." The analogies between beriberi and pellagra are considered, and in reference to the paper summarised in this *Bulletin* Vol. 1. p. 484 and another the author writes :—

"The writer is guilty of publishing two papers a few years ago, based on a considerable clinical experience, intended to show that beriberi is not a deficiency disease. Because of my inability to explain certain exceptions (some of which, indeed, I am still unable to explain), the great mass of compelling evidence was undervalued."

Credit is given to Dr. W. E. Deeks for having in 1912 [see this *Bulletin*, Vol. 2. p. 491] indicated the causation and cure of pellagra, both dietary, which in 1915 were proved operative and effective by Goldberger. The author goes on to apply the new knowledge to lesser degrees of vitamine starvation such as are common in America at the present day and instances the feeding in the Weir Mitchell treatment of neurasthenia, the success of the modern insane asylum "the real dynamics [of which] lie not in their pharmacies but in their kitchens," the necessity of vitamine-rich food to the poor. "Bolted, vitamin-robbed corn meal is, practically, the only kind you can buy in the Texas market"; the shorts, containing "most of the nerve protecting, life-saving vitamins," are sold for stock feed. The "food cranks," clamouring for whole grain bread, have turned out to be "seers and prophets."

A. G. B.

Swellengrebel (N. H.). **De afdeeling voor tropische hygiëne van het Koloniaal Instituut te Amsterdam.** [The Department of Tropical Hygiene in the Colonial Institute of Amsterdam.]—*Eigen Haard.* 1916. Aug. 26. No. 35. 12 pp. With 5 plates.

An account of the new department for tropical hygiene in the University of Amsterdam. One of the photographs shows the wing in the new buildings of the Colonial Institute, in which the department will be housed. It will be under the direction of Professor J. J. Van Loghem, Dr. N. H. Swellengrebel and Dr. W. A. Kuenen. Another interesting photograph shows a group of the staff and workers.

J. B. Nias.

Rivas (D.). **The Thermogenic Reaction of the Body against Infection and its Bearing upon Immunity.**—*New Orleans Med. & Surg. Jl.* 1916. Aug. Vol. 69. No. 2. pp. 125–135.

The author, who is Assistant Professor of Parasitology and Tropical Medicine, University of Pennsylvania, classes the means of defence of the body against infection as :—

(1) Mechanical—skin and mucous membrane.
(2) Organotropic and Physicochemical—certain organs and tissues are antagonistic to certain infections.
(3) Humoral—leading to the formation of antibodies.
(4) Histogenic—the tissue produced restricting the infection.
(5) Cytogenic—phagocytosis.
(6) Thermogenic.

He goes on to consider (*a*) the normal and (*b*) the morbid thermogenic activity of the body. The first explains our immunity against tuberculosis of birds (creatures of higher temperature) and infections of cold blooded animals.

Under (*b*) he discusses febrile and afebrile diseases. In the group of febrile diseases are included most of the bacterial diseases. Among the afebrile diseases he places—all fungoid diseases, most protozoan diseases except malaria and relapsing fever, and all the metazoan diseases except the acute stage of trichiniasis. Trypanosomiasis is not regarded as a febrile disease ; fever in metazoan diseases is usually due to bacterial infection. Thermogenic activity is considered to be in relation to the toxic nature of the virus ; the more toxic the virus the more fever. Among the bacterial diseases leprosy and cholera are non-toxic and afebrile. However, the reaction depends partly on the dose ; e.g., a guinea-pig will react to a normal dose of anthrax bacilli or a minimal lethal dose of diphtheria toxin, but if the dose is increased a hundred times the animal dies with subnormal temperature.

Febrile infections usually confer immunity ; afebrile do not. The absence of fever in all fungoid and most protozoan and metazoan infections is held to explain the incurable nature of these diseases. The paper ends with a suggestion for the investigation of the use of thermotherapy in tropical medicine.

[An interesting paper with several debateable points. Two minor details are perhaps worth mention. It is stated that " it is not improbable that the bite of more than one infected tsetse fly is required to produce sleeping sickness." *T. gambiense* infection in susceptible animals, both large and small, has repeatedly followed the bite of a single infected fly. This does not however disprove the point the author is making, namely that the body is capable of destroying a certain number of introduced protozoa. Do mosquitoes " bite by preference the white rather than the negro ? "] A. G. B.

MASTERS (Walter E.). **The Prevention of Conception amongst the Natives of the Kasai Basin, Central Africa.**—*Jl. Trop. Med. & Hyg.* 1916. Apr. 15. Vol. 19. No. 8. pp. 90–91.

The author states that the administration of drugs by the mouth and the mechanical obstruction of the vagina are the usual means of prevention of conception among the natives of the Kasai basin. Amongst certain tribes a child is not desired more than once in three years. The vagina is therefore plugged with rags or dried grass. Three cases are quoted. In one there was constipation and urinary retention of eight days duration. Examination was not allowed and after death " the vagina was found to be very firmly plugged with a cloth which was about half the size of a man's closed hand." In another case with similar symptoms the vagina was found to be plugged hard with finely chopped grass. This was removed and the patient was rapidly recovering when two days later she did not seem so well and a cloth was found to have been wedged in the vagina. She was two months pregnant. The third case was one of criminal abortion produced by a dose of black powder. Owing to these methods and trypanosomiasis the author thinks the region will be depopulated in the course of a few years. "As many as 45 per cent. of the thousands whom I have examined have enlarged cervical glands which mean that they will die off in about three years." [This seems unduly pessimistic unless the enlargement was marked and no cause for it other than trypanosomiasis could be assigned.] A. G. B.

CANTLIE (James). **Anatomical Data concerned in Operations on the Liver and in Clinical Examinations.**—*Trans. Soc. Trop. Med. & Hyg.* 1916. July. Vol. 9. No. 8. pp. 221–233. With 4 figs. & 1 plate.

This paper deals with, the clinical constants that are of value in determining the size of the liver; the demonstration that there are two livers, a right and a left, which are independent in their vascular and bile duct supply; the danger of wounding the inferior vena cava in searching for pus and how to avoid it; the directions taken by hepatic pus when it passes upward into the chest. The points are usefully illustrated by diagrams and a plate.

A. G. B.

PELLINI (Emil J.) & WALLACE (George B.). **The Pharmacology of Emetin.**—*Amer. Jl. Med. Sci.* 1916. Sept. Vol. 152. No. 3. No. 534. pp. 325–336. With 4 figs.

These authors write from the Department of Pharmacology, University and Bellevue Hospital Medical College. Referring to the widespread use of emetin in pyorrhoea alveolaris they say, "It is not at all improbable in view of the somewhat unusual toxic effect it may induce in animals, that considerable damage has already been done through injudicious dosage or too long-continued administration." They give an account first of other people's researches and then of their own. In these they used the product of the "Hoffman-La Roche Chemical Works, Inc.," who guaranteed its purity. Graphs are reproduced shewing the action on the blood pressure and respiratory movements in dogs, and other effects of the drug.

"Summary. From our experiments we wish to emphasize the following points:—

"1. Emetin depresses and may eventually paralyze the heart.

"2. It is a powerful gastro-intestinal irritant whether given by mouth or subcutaneous injection.

"3. It causes a definite derangement of metabolism, characterized by an increase in nitrogen loss and an acidosis.

"4. While in normal individuals given moderate doses, these actions may not be of importance, in pathological states of the circulation, intestinal tract, or metabolism, they may be a very definite source of danger."

A. G. B.

ROBB (R. M.). **Heat Fever (Non-Infective Cerebro-spinal Fever).**—*S. African Med. Rec.* 1916. May 27. Vol. 14. No. 10. pp. 154–155.

"About 250 cases" were observed in "East Africa" of a condition described by the author as one "involving the central nervous system, manifesting itself by symptoms of increased pressure of cerebro-spinal fluid, probably due to actual overheating of body tissues and increase of all secretions, of which cerebro-spinal fluid is one." The symptoms are summarised, but no details of cases nor results are given. No blood examinations are recorded. Quinine and brisk depletion are stated to have been of value.

A. G. B.

TEN BRINK (K. B. M.). **Sporotrichose.** [Sporotrichosis.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 2. pp. 178–195. With 9 plates.

An introductory address given by the author at the meeting of the Society for promoting Medical Science in the Dutch Indies on August 19th, 1915. Attention is drawn to the difficulty of diagnosing this condition by clinical features alone. The resemblance in many cases to tuberculous and syphilitic ulceration is extraordinary, and this point is illustrated by a number of good photographs which accompany the paper. To anyone who can make a good Sabouraud's medium the laboratory culture of the fungus is easy, but on the other hand, if the medium is faulty, many disappointments and failures in diagnosis will occur. The harmfulness of treating the condition with mercurials and salvarsan, under the belief that it is syphilis, is duly dwelt upon, as also the impropriety of surgical measures under a wrong diagnosis of tuberculosis. The disease shows no tendency to natural cure, as a rule, but steadily progresses, with the result of producing hideous deformities both on the face and elsewhere. On the other hand, with a liberal dosage of iodide of potassium (4 to 8, or even 12 grammes per diem) the condition can be cured in a few weeks. Relapses, however, may occur if the medication is not kept up for at least a month after the healing of the lesions.

J. B. N.

ESCOMEL (Edmundo). **Sobre un caso de blastomicosis.** [A Case of Blastomycosis.]—*Cronica Med.* Lima. 1916. July. Vol. 33. No. 637. pp. 210–213.

The report of a case of blastomycosis, unfortunately not accompanied by illustrations, in a muleteer, which was treated by the combined local excision of the lesions, by means of the actual cautery, and internal injection of tartar emetic. The action of the latter did not seem so prompt as it is in cases of leishmaniasis. A considerable number of giant cells were noticed in sections of the excised tissue.

J. B. N.

PATTON (C. R.). **Preliminary Note on a Disease called "Bungpagga," found in the Northern Territories of the Gold Coast.**—*Brit. Med. Jl.* 1916. Apr. 1. pp. 483–484.

This curious disease, the author says, has long been known to the natives of West Africa; those of the Gold Coast, Northern Territories, Nigeria, and Senegal are said to recognise it readily. There are native names for it in the Hausa, Dagarti, Walla and Lobi languages. It occurs at the time when the guinea corn and rice are ripe and ready for harvesting, that is, just after the rainy season in the Northern Territories. It attacks all those who are able to eat corn. "It appears to me to be due to a micro-organismal infection which produces a neuro-toxic effect as well as a local reaction." In every one of the pus slides examined the author found a heavy infection of saccharomyces. He is inclined to think that the disease is caused and perpetuated by a yeast fungus. "The yeast spores probably remain in the mud bins in which

the grain is stored awaiting a favourable opportunity to grow. . . . The grain becomes infected in the bin, the people eat the grain raw and their intestines are secondary incubators." The incubation period appears to be three days.

Symptoms.—"The onset is sudden; one or more rigors may usher in the attack. The temperature rises rapidly to 103° or so. There is extreme tenderness in the muscles which are to be the seats of inflammation. Within twelve hours painful tumours make their appearance in the affected muscles; only the voluntary muscles are affected, and the abscesses seem always to occur near their insertions. There may be only one nodule, or a crop. In some cases the distribution is bilaterally symmetrical. The tumours are deep-seated; they are hard, non-fluctuating, very painful, with their long axes either in or parallel to the long axes of the muscles affected. They do not correspond to lymphatic glands. Each tumour is about the size of an English hen's egg. They are at first hard and firm, and are easily visible and palpable; later on, if the patient survives, they become slightly soft, but never flabby. Usually, in mild cases, the abscesses point after some weeks, and burst if unopened. As a rule, the fewer the nodules the better the prognosis."

If the patient survives the acute stage he stands a good chance of recovery; the deaths usually occur within the first week.

A. G. B.

Budzynski (B.) & Chelchowski (K.). [Abstract and Comments by MacLeod (J. M. H.).]. **Hunger Swelling in Poland.**—*Jl. Trop. & Hyg.* 1916. June 15. Vol. 19. No. 12. pp. 141–142.

One hundred and ten cases are described of an affection occurring in Poland as a result of the insufficiency and inadequacy of food caused by the German occupation. Nearly half the patients were children under ten; eight died. Their food consisted of potatoes, as much as 5 lbs. per head per day, small quantities of soup, and bread, generally bad, on certain days. The symptoms were "oedema, debility and muscular weakness, intestinal disorders, mental depression, dimness of vision, disappearance of sexual impulses, and alterations in the blood and urine." The oedema might be extreme; in some cases it disappeared in hospital, disclosing extreme wasting. The percentage of haemoglobin was reduced by about half; the lymphocytes and eosinophiles were increased. The condition was attributed to bad potatoes and the lack of other food, especially fats.

A. G. B.

Gaitan U (A.). **Fiebres biliosépticas.** [Septic Bilious Fevers.]—*Repertorio de Med. y Cirug.* 1916. June. Vol. 7. No. 9. [No. 81.] pp. 387–405.

By bilioseptic fever the author understands a febrile complaint accompanied by enlargement and tenderness of the liver with jaundice, non-infectious and not directly fatal, lasting from 5 to 30 days, and occurring mostly in women. Tenderness in the region of the gall-bladder is the principal physical sign. Notes are given of 9 cases, 5 being in women. Treatment appropriate to the symptoms will be found in the employment of calomel, salicylate of soda, and rhubarb, with antipyretics. Cholecystotomy was performed in one case, with removal from the gall-bladder of 50 cc. of thick dark bile, of which, apparently, no bacteriological examination was made. The patient, a

man aged 55, died suddenly on the following day, during the dressing of the wound. In a second case, that of a woman aged 24 years, sudden death took place on the 20th day of the disease, from syncope, no autopsy being obtained. The other cases got well.

J. B. N.

SPAGNOLIO (Giuseppe). **Nuovi casi clinici di spleno-epatomegalia febbrile da virus ignoto.** [Further Cases of Febrile Enlargement of the Spleen and Liver of Unknown Origin.]—*Malaria e Malat. d. Paesi Caldi.* 1916. May-June. Vol. 7. No. 3. pp. 145–151.

Professor GABBI and the author have already placed on record cases of disease in children from Southern Italy and Sicily, in which the clinical picture of kala azar is practically complete, with the exception that it was impossible to demonstrate the parasite of kala azar, or any other infective agent, either in the blood or in the tissues of the liver or spleen, at any rate during life. Two more cases are now added to the list.

Case 1. A female child, aged 6 years, born in Calabria. Family history unexceptionable. No proof of syphilis in the father, who had a negative Wassermann reaction. In April 1913, after a fright, the health of the child became impaired. The temperature rose above the normal every night, and fell towards morning with profuse sweating. The medical attendant detected enlargement of spleen and diagnosed malaria, although the locality in which the child lived was not malarious. Treatment with quinine was without effect, and eventually the child was sent to Rome, to the Clinic for tropical diseases, on a suspicion of leishmaniasis, in December of the same year. On admission, the child was noted to be pallid and emaciated, with a purpuric eruption which was most copious on the lower limbs. The temperature was above normal, and the pulse 120 per minute. There was no enlargement of the glands of the neck. The thoracic organs appeared free from disease, but the abdomen was swollen and the liver and spleen were both much enlarged. No fluid could be detected in the abdominal cavity. The inguinal glands were enlarged. The urine was turbid and contained one per mille of albumin and a sediment of blood corpuscles, casts and renal epithelium. In the stools there were neither worms, nor ova. The haemoglobin of the blood was reduced to 35 per cent. of the normal, and the red cells to 2,200,000 per cmm. The leucocytes amounted to 4,400 per cmm. Cutaneous tubercle reactions were negative; Wassermann ditto. A splenic puncture revealed no trace whatever of Leishman bodies, nor of malarial parasites. Blood cultures of every kind were also negative. After two months stay in hospital, during which a haemorrhagic otitis of both ears occurred, the child left, and after further treatment elsewhere died in October of the same year, i.e., after an 18-months' illness. No autopsy could be obtained. Monkeys not being available, inoculation experiments were tried with dogs and rabbits during the child's stay in hospital, but without result.

Case 2.—A boy, aged 14 years, a native of Messina. Family history good. Personal history also good, until the age of 12 years, when a severe attack of erysipelas left some delicacy behind it. In November, 1915, the child began to suffer from loss of appetite and debility, and hectic fever. Enlargement of the spleen was noticed, with pallor of the skin and mucous membranes. In the month of March following, petechiae appeared on the limbs and trunk, and also gingivitis and swelling of the palate, which culminated in noma of which the patient died. An autopsy was not obtainable, but the physical signs of disease in the viscera were practically the same as in the preceding case. All sero-diagnostic and other laboratory examinations were quite without a positive result.

It appears to the author that these two cases should be put on record.

J. B. N.

FUSCO (Pietro P.). **Fegato e cirrosi dispeptica in Tripolitania (Morbo di Budd).** [Dyspeptic Cirrhosis of the Liver (Budd's Disease) in Tripoli.]—*Malaria e Malat d. Paesi Caldi.* 1916. Apr. 20. Vol. 7. No. 2. pp. 69–79. With 1 text-fig.

According to the author the diet of the native Arab in Tripoli is so poor that for months together the people have to live on the grass, which forms the forage for their horses and camels. This is cooked with pepper and other spices in sheep's fat; the latter being often rancid. The result is the production of the so-called "dyspeptic liver" of E. BOIX and others, of which the exciting cause is the butyric or other fatty acid present in the rancid oil or fat used by the Arab. The disease, as might be expected, is mostly found in men of middle age, and the author gives an illustration of a patient with the area of his liver and spleen mapped out by dark lines. On an appropriate diet, especially of milk, in a hospital, and with the aid of iodides and purgatives, the condition quickly improves. The author goes on to point out that a similar condition can arise in Europeans who, in a hot climate, make use of spicy and fatty foods, and do not take exercise, and in Tripoli the condition is not unfrequently seen in European colonists, who do not adapt themselves to the climate in matters of feeding and personal exercise. In particular, the habit of sleeping too much in the day time, after the mid-day meal, is condemned, it being a matter of fact that those who lead the most active lives are those who enjoy the best health, in tropical countries. Pathologically, the condition consists in a hypertrophy of the connective tissue septa between the lobules of the liver, around the branches of the portal vein, the liver cells themselves remaining for the most part intact.

[The Anglo-Indian practitioner is, of course, quite familiar with the condition of things here described.]

J. B. N.

BALFOUR (Andrew). **The Treatment of Hepatic Failure in Yellow Fever, Malaria and Other Conditions: A Suggestion.**—*Lancet.* 1916. May 20. pp. 1038–1039.

In a case of multiple liver abscess which the author described twelve years ago he believed that death was due to shock, but afterwards concluded that the cause of the fatal result was delayed chloroform poisoning. He believes that similar symptoms may occur in tropical diseases where the liver fails to perform its functions, e.g., yellow fever, epidemic jaundice, Weil's disease, blackwater fever, certain forms of fatal malaria. The symptoms associated with the destruction of liver cells are thus stated:—

"They are chiefly of cerebral origin, pointing to a poisoning of the higher nerve centres. The patient begins to grow restless, watchful, excited, anxious, and light-headed. He complains of severe headache and, it may be, of photophobia. He wanders in his mind and suffers from an incoherency of ideas and from hallucinations. His muscles twitch and tremble and delirium ensues. It may be of a low, muttering type, or may become active, the patient trying to get out of bed, but it is not usually very violent, for there is great weakness. Convulsions may set in, and if cardiac or respiratory failure does not occur coma ends the scene. In addition, we find that if jaundice is already present it deepens, while hiccough, clammy sweats, and anuria are not infrequent."

These symptoms have been attributed to the toxins of the virus causing the disease and no attempt has been made to treat the serious liver condition. Attention is drawn to STERNBERG's treatment in yellow fever and the alkaline treatment applied with success in blackwater by BURKITT [see this *Bulletin*, Vol. 7, p. 29]. The acidosis in this condition is due to the fatty acids being poured into the blood owing to the disordered hepatic condition. Balfour thinks that on the lines suggested by Col. W. HUNTER we may go farther and endeavour to prevent or at least cut short the rapid destruction of liver cells. A synopsis is given of Col. HUNTER's views :—

"He believes that in such diseases the antitoxic functions which the liver cells discharge in relation to the portal blood are first of all depressed and then suppressed by the poisons generated by the disease viruses. Strain is thrown on the liver cell. It endeavours to maintain its energy by taking up carbohydrate material. If sufficient cannot be obtained from sugar it turns to fat, and when this also fails to yield the supply to tissue proteins. There is thus increased fat metabolism with acidosis and acetonuria, and the liver cell, coming under the influence of its own ferments, undergoes autolysis and thus presents the characteristic appearances seen post mortem. Colonel Hunter further thinks that ammonia, as a rule, keeps the ferments in check, and that the practice, common alike before operations and in the early stages of febrile diseases, of purging the patient with calomel and of withholding food, prevents the formation of ammonia and thus the hepatic ferments have full play. As already stated, the liver cells being thus thrown out of action fail to deal with the poisonous portal blood. The latter passes unchanged into the general circulation and the characteristic cerebral symptoms result. . . .

Balfour continues :—

"Colonel Hunter's theory and researches have certainly led to one important practical conclusion, i.e., the necessity in cases of delayed chloroform poisoning and toxaemic jaundice of keeping up the supply both of sugar and of protein food, the latter in peptonised form. The former is ensured by the administration of glucose. It can be given by the mouth or as rectal enemata, solutions of 5 or 10 per cent. being used. If pure glucose cannot be obtained, preserved (candied) fruits may be given, or, indeed, sugar in any form. The necessity for protein is met by administering enemata of peptonised beef-tea, eggs, or other protein material."

This line of treatment is suggested for such diseases as yellow fever and bilious remittent fever, when jaundice is an important feature.

A. G. B.

LONGRIDGE (C. Nepean). **Cases of Acute Yellow Atrophy of the Liver treated by Injections of Sodium Bicarbonate ; Recovery.**—*Jl. Roy. Army Med. Corps.* 1916. June. Vol. 26. No. 6. pp. 812–814.

The patient, a man of 25, was admitted to the Giza Hospital, Egypt, from Gallipoli on October 10th, 1915, having been taken ill on October 1st. His symptoms were not severe and he was believed to be suffering from epidemic catarrhal jaundice.

"On October 13th marked icterus had developed, the water was mahogany-coloured and the stools like clay ; temperature normal, liver dullness normal. The following morning he had a severe fainting attack for no ascertainable cause, and complained of pain in the epigastrium. He vomited occasionally and was obviously ill ; the jaundice had increased and the liver dullness was found to extend from fifth space in nipple line to just below the costal arch. He was ordered a drachm of glucose in five ounces of water every four hours by the rectum, and a drachm of sodium

bicarbonate in two ounces of water every two hours by the mouth. A specimen of water was examined and found to contain large quantities of leucin and tyrosin. The temperature was subnormal and the pulse 70, of good quality.

"On October 15th the patient was no better. He had continued to vomit bilious fluid, the bowels had acted and the motions contained a small quantity of blood; the tongue was clean, but the man was violently delirious, and the liver dullness had descended to the sixth space in the nipple line. The injections of glucose into the rectum were continued with difficulty and could not be given regularly. The sodium bicarbonate was now administered hypodermically, 100 cubic centimetres of a two per cent. solution being injected morning and evening.

"The delirium continued throughout the night and the next day; there was incontinence of urine and faeces, some blood was noticed in the vomit, which was now less frequent. . . . Only a few ounces of very dark urine were passed. The injections of sodium bicarbonate were continued to the exclusion of everything else. . . . On the following morning (October 17) the patient was conscious and had slept a few hours, the pulse improved and the liver dullness had gone up half an inch to the sixth space. Over 200 cubic centimetres of alkaline urine were passed, still containing leucin and tyrosin."

Thereafter the patient made an uninterrupted recovery. The author records this case "because in the opinion of Col. HUNTER and Major Llewellyn PHILLIPS it was one of acute yellow atrophy, and the injections of sodium bicarbonate were the probable cause of the favourable termination."

A. G. B.

PIJPER (A.). **Preliminary Note on a Case of Thrush-like Disease due to *Monilia rugosa* Castellani, 1910.**—*Jl. Trop. Med. & Hyg.* 1916. Nov. 1. Vol. 19. No. 21. p. 249. With 1 text fig.

The author, who writes from Bethal, South Africa, was called to see a child who presented numerous whitish thrush-like patches on the oral mucosa. One of these was inoculated on Sabouraud's agar and "after two or three days a growth developed which had the macroscopical aspect of *Monilia rugosa*, Castellani." The growths, which are illustrated, show the characteristic crinkled surface. The author believes he has found asci in the growth, a finding which would necessitate the transfer of the species from the genus *Monilia*. He gives an account of the cultural characters and biochemical reactions.

A. G. B.

CASTELLANI (Aldo). **A Case of Vaginitis probably due to *Monilia pinoyi* Cast. 1910.**—*Jl. Trop. Med. & Hyg.* 1916. Apr. 15. Vol. 19. No. 8. pp. 89–90. With 2 figs.

"In a case of vaginitis [in a Singhalese woman] with thick purulent discharge and no thrush-like patches on the mucosa, a fungus was grown with all the characteristics of *Monilia pinoyi*, Cast., 1910. This fungus was probably the cause of the condition."

M. pinoyi was originally found in sputum. There is a figure of the fungus and of a glucose-agar culture.

A. G. B.